In Two Parts—Part 1

AMERICAN GAS JOURNAL

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HELPING TO WIN A WAR

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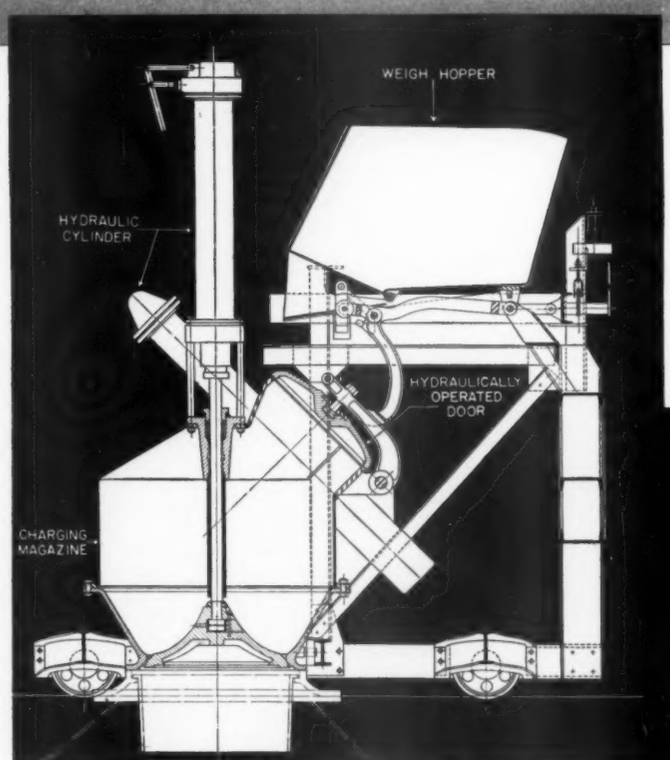
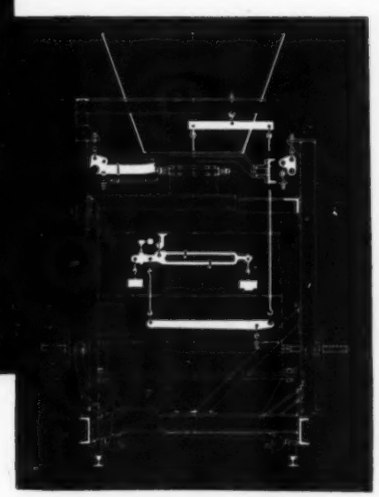


INCREASES CAPACITY *Saves Labor*



At least ten per cent increase in capacity of your water gas machine can be obtained by the addition of a Semet-Solvay Automatic Charging Machine. Part of the increase is obtained by eliminating shut-downs for charging, part from the added efficiency of a fuel bed of constant depth.

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The Semet-Solvay Automatic Charging Machine is built for use with any make of water gas or blue gas machine. Automatic charging is not recommended however when the fuel used is bituminous coal. If you operate on coke or anthracite coal, why not write us for further information and a list of satisfied users.

SEMET-SOLVAY ENGINEERING CORPORATION

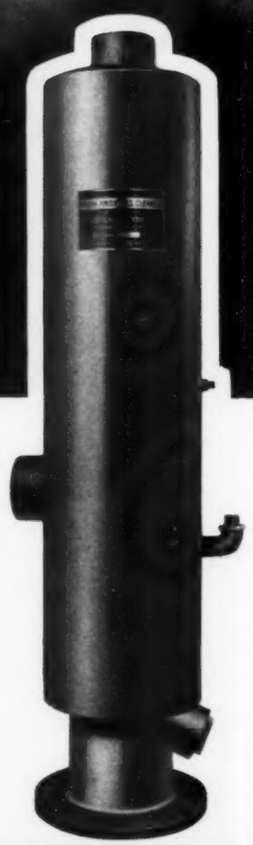
WE SELL SOLUTIONS TO HARD PROBLEMS

40 Rector Street New York, N. Y.

AMERICAN GAS JOURNAL, January, 1942. Vol. 156, No. 1. Published monthly by American Gas Journal, Inc., at 34 North Crystal St., East Stroudsburg, Pa. Executive and Editorial offices at 53 Park Place, New York, N. Y. Entered as second-class matter, October 7, 1928, at the post-office at East Stroudsburg, Pa., under the Act of March 3, 1879. Printed in U. S. A.

"OLD DUSTY" may be stealing your gas...your profits

Cutting a gas line and blowing it out is good. Keeping dust out is better.



HOW can you tell when "Old Dusty" has been on the job? Easy! He scratches deep grooves on regulating valves, meter valves, orifice plates, displacement meters . . . on all equipment through which gas flows. Result: You lose money because unmetered gas gets away from you, proper pressures cannot be maintained, equipment wears out, your customers complain.

WHY PUT UP WITH DUST, RUST, SCALE AND LIQUID CONDENSATES WHEN THIS CLEANER COSTS ONLY $95

"K" Series has been designed for—City Regulators . . . Small city gate stations . . . Town border stations . . . Medium and large industrials. (*Model shown is K-6.* It will condition 396 MCF standard gas per day flowing at 30# gage pressure.)

Keep this dust out of YOUR lines

ASK FOR FULL INFORMATION REGARDING THE "K" SERIES GAS CLEANER. Please state where it will be placed, maximum gas volume MCF hour, minimum and maximum pressures . . . and we will quote you on the size and type you need.

BLAW-KNOX
GAS CLEANERS

JAN 23 1942

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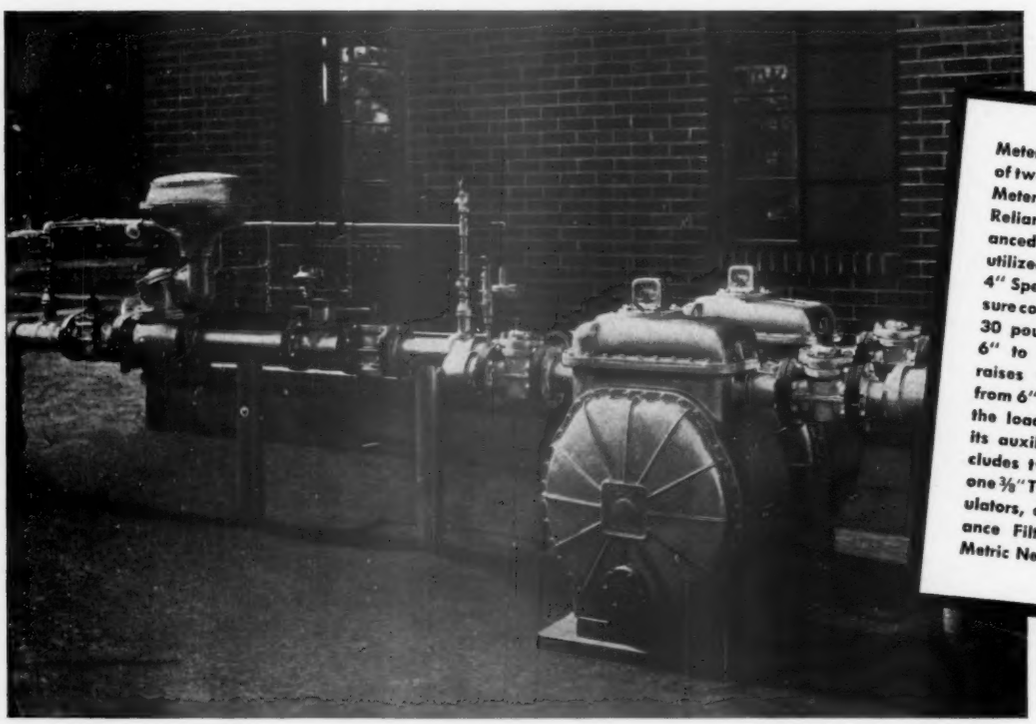
ANOTHER ALL-AMERICAN JOB

This model new master meter station was built by a leading gas company in the South, to measure gas to a large construction operation.

The meters and regulators specified for the installation were American Meter Company products, bearing the METRIC-AMERICAN or RELIANCE-AMERICAN trademark.

This gas company is exacting in its specifications on all counts relating to instrument accuracy, low maintenance, and long-term values. It is impressed only by actual performance and cost records.



Metering equipment consists of two 500-B Metric Ironcase Meters. A 4" Type CBV-300 Reliance Combination Balanced Valve Regulator is utilized in conjunction with a 4" Spencer automatic pressure controller; inlet pressure 30 pounds, outlet pressure 6" to 8". This controller raises the outlet pressure from 6" to 8", depending on the load requirements, and its auxiliary equipment includes two 1" Type H and one ⅜" Type A Reliance Regulators, a ¾" Type A Reliance Filter, and three ¼" Metric Needle Valves.

METRIC METAL WORKS • ERIE, PA.

AMERICAN

METER COMPANY

INCORPORATED (ESTABLISHED 1836)

1487

JANUARY
1942

AMERICAN
GAS JOURNAL

VOLUME 156
No. 1

Preparedness

WE DID NOT ASK for war. The American people wanted nothing better than to live at peace with other nations and to share prosperity through commerce and industry. Others have sought power through war and destruction, and hence no course lies open but to meet that challenge.

In other wars, there have been bands, martial music and parades. Today, we see merely grim determination on the part of each one to do his part, no matter how small that part may be.

More than ever before, we of the civilian population have a role to play. This is a war of production and supplies. Also, the bombing plane has carried the combat zone to homes and factories far behind the lines of battle. In other days we had to think only of sabotage; now we must think also of possible attack from the air.

At a time like this, we must guard against hysteria on the one hand and complacency on the other. We should prepare calmly and fully to meet the worst that can reasonably be expected, and be constantly ready to meet it. For example, we hope those who say our cities will not be bombed are right; but we feel any gas company in either the Atlantic or the Pacific seaboard areas, which fails to prepare methodically for such an eventuality, would be derelict in its duty. The enemy seeks those who are unprepared.

Experience in Great Britain has shown that the plants and particularly the distribution systems of gas companies are somewhat vulnerable to air attack. A high explosive bomb landing in or near a street will probably break a gas main, water main, sewer and often electric and telephone cables. Water and sewage may flood the gas main, services and meters, or the gas may continue to escape and take fire. Are you prepared to handle such a contingency and restore service promptly?

The blackout of the flames from coal gas or coke oven plants or from the stacks of water gas sets poses a very important problem. The same is true of the glow from the hot coke car. We have been told that the steam from the quenching tower or from the exhaust head may be seen at great heights even at night. Our holders obviously make good targets. Yet in Great Britain it seems that gas has somehow been kept on the towns with but few general interruptions, though many temporary local outages.

We of the *Journal* staff have been expecting for some months that our country could not escape an active part in this war. Our last few issues, therefore, have been devoted largely to matters which should be helpful to our industry in case it should come. We urge you to review the information which they contain. We also call your attention to an excellent "Bibliography on National Defense and Air Raid Precautions for Public Utilities" in the July-August issue of *A. G. A. Monthly*.

Most of the larger companies are taking adequate steps to prevent sabotage and to prepare for possible air attacks. To the medium sized and small companies which have not yet given thorough consideration to these problems, we suggest prompt attention to the following:

(1) Denying access to the plant or outlying stations to any except authorized persons.

(2) Giving attention to proper fencing, lighting or other protection.

(3) Organizing the entire force to handle emergencies, including black-out, damage to the works, shutting off gas in case of broken mains or services, making repairs and restoring service.

(4) Determining what repair equipment neighboring companies have, which might be available in emergency.

(5) Examining maps and definitely locating at least the more important mains. Checking valve locations and making sure, if possible, that the valve stems are free and will operate. It is a good idea to have one or more prints or photostatic copies of main maps at different points; but only responsible authorized persons should have access to these.

(6) Locating stocks of material and repair parts in at least two different places.

It is our opinion that the above are all matters worthy of consideration; others will undoubtedly suggest themselves. London believed it would not be seriously bombed; but it was. Bombing here on a comparable scale is unlikely, — but bombing **"can happen here."**

Two important problems have presented themselves for prompt solution:

(1) Should customers turn off the gas at the meter in the event of air attack?

(2) How should gas street lights be blacked out, since turning off the main valve still leaves the pilot burning?

The Office of Civilian Defense has issued the following statement with respect to the first of these:

December 18, 1941

PUBLIC STATEMENT FOR HOUSEHOLD GAS USERS ON PROCEDURE DURING AIR RAID ALARMS

"The American Gas Association recommends that you make no attempt to shut off the main gas valve. Simply turn off the stove burners that are lit but not the pilot light. If the house is badly damaged the main gas valve should be shut off. Once the main valve is turned off, for any reason, do not turn it on again yourself. Call for a trained man. Your local gas company is working out further detailed directions with your local defense council. Watch for these instructions, then follow them."

We will use this wording in future releases.

OFFICE OF CIVILIAN DEFENSE

Conditions vary in different places, and some companies feel that gas should be turned off if the immediate area is actually being bombed, or if the gas mains or services in the vicinity are damaged so that the pressure becomes low. However, the best opinion is that once the gas is shut off the customer should not attempt to turn it on again himself.

If you are on the Eastern or Western seaboard, your customers should be advised regarding the turning off of gas in the event of air attack. Perhaps this has already been done.

The war has called attention to the relatively large amount of gas street lighting still in use. At the same time it has raised an important blackout problem.

The Welsbach Street Lighting Company of America, Philadelphia, Pa., has developed a simple, inexpensive, easily attached blackout shield. Normally this will not interfere with the light; but in the event of an air alarm it can be quickly dropped so that it will black out both lamp and pilot without extinguishing either. The raising of the shield is equally simple. A photograph of this device is here shown.

As we have said, most of the larger gas companies are making very complete preparations to meet possible emergencies. Should any of our readers, particularly in the medium sized or smaller companies, have any questions, we shall be glad to have them referred to us. If we cannot answer them ourselves we shall refer them to others who can.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVE.,
NEW YORK, N. Y.

December 10, 1941.

Honorable Franklin D. Roosevelt,
The White House,
Washington, D. C.

Dear Mr. President:

The Executive Board of the American Gas Association, meeting December 10, 1941, reaffirms its pledges for full cooperation of the gas utility industry of America with our Government in the national crisis.

Together with Federal agencies, we have long since distributed information for the protection of our plants, wells, transmission lines, and other facilities. Measures have been adopted for the protection of civilian life and for the assurance of a vital fuel service to the homes and industries of America.

We are carrying out plans of close cooperation in the program of nutrition in the national defense.

We are equally ready to join in all necessary protection to the public resulting from air raids and other enemy action, including sabotage, in preparation for which we have issued information based on procedure in other countries at war.

Very truly yours,

(signed) GEORGE S. HAWLEY
President

THE WHITE HOUSE
WASHINGTON

December 17, 1941.

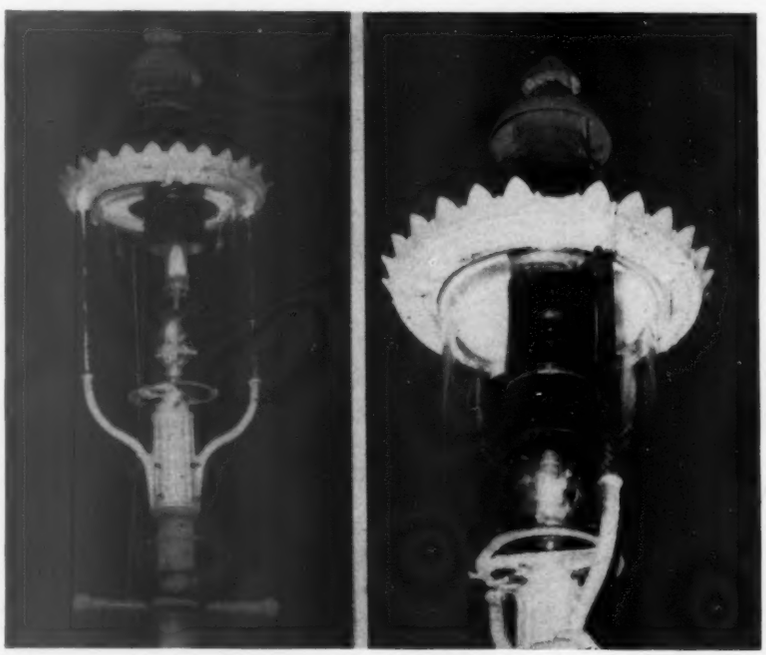
My dear Mr. Hawley:

The President wishes me to thank you for your letter reaffirming the pledge of cooperation and extending a wholehearted offer of service on behalf of the Executive Board of the American Gas Association. This assurance, together with the voluntary responses from practically every large organization and group in the country, gives concrete evidence of a determination to spare no effort and a readiness to assume any sacrifice necessary to a successful outcome in this crisis.

Very sincerely yours,

M. H. McINTYRE (s)
Secretary to the President

George S. Hawley, Esq., President
American Gas Association
420 Lexington Avenue
New York, N. Y.



GAS STREET LIGHT BLACK-OUT SHIELD

The view on the left shows the sleeve raised for normal operation, and the rod by which it may be raised and lowered. The view on the right shows the sleeve lowered and the light blacked-out.

THE GAS UTILITY INDUSTRY IN 1941

by

George S. Hawley

President, American Gas Association

GEORGE S. HAWLEY

WAR FINDS THE GAS INDUSTRY PREPARED and on the alert. Gas fuel is one of the nation's prime energy resources; it constitutes a vital component of the nation's fuel supply. In today's all-out program to speed the production of war materials, it is inevitable that gas fuel will be utilized to the utmost limits of its potentialities, especially in highly industrialized areas. Plans to meet that responsibility are well advanced.

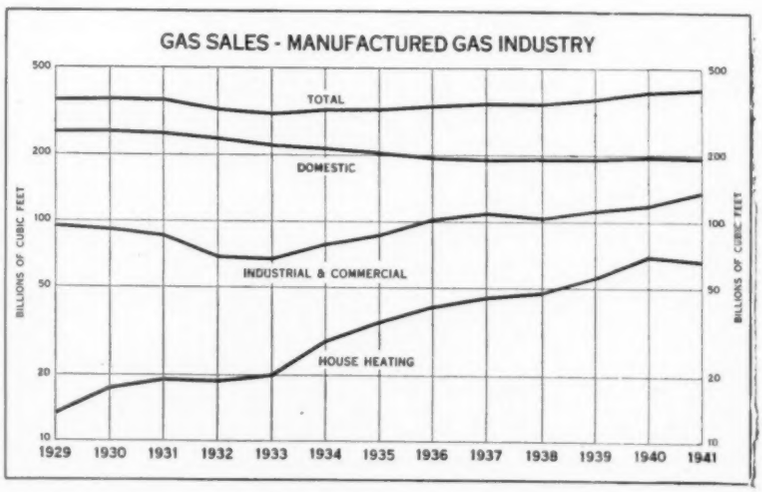
Two years before the shooting began in Europe the gas industry started to prepare itself against a state of war here. Valuable data obtained from abroad, prior to and after hostilities developed, covering protection of plants, transmission lines and other facilities from air raids and other enemy action, including sabotage, have been distributed throughout the industry. Having thus anticipated the coming of war, the gas industry is well prepared to meet the tests that are sure to come.

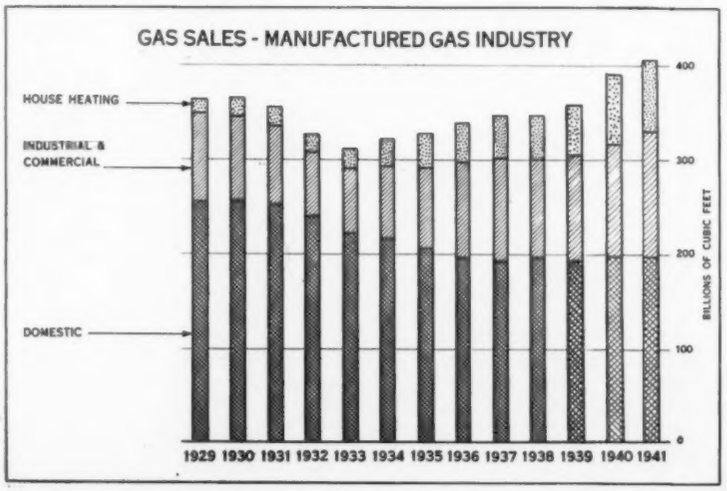
In several noteworthy respects, operations of the gas industry in 1941 set up new records. Customers served reached a new high, and so did sales and revenues of the combined manufactured and natural gas industries. The unprecedented demand by the public for the latest fuel and vitamin-saving types of gas ranges, including the popular certified performance models, also surpassed all previous sales records.

At the year end, 18,618,000 customers, representing the largest number ever connected to the mains of the industry, were served by manufactured and natural gas companies. This was an increase of 627,000 over the year 1940. As between the two branches of the industry, manufactured gas companies now serve 10,430,000 customers and the remaining 8,188,000 are served by natural gas companies. Total population reached by the industry is now approximately 85,000,000.

Revenues of the entire industry, both manufactured and natural, aggregated $909,441,000, the largest ever recorded, and a gain of 4.3 per cent over 1940. Natural gas companies grossed $522,053,000, a gain of 6.0 per cent for the year, and a new record, while revenues of manufactured gas companies were $387,388,000, as compared with $379,023,000 in 1940, an increase of 2.2 per cent.

Sales of natural gas for industrial





purposes rose from 716,668,000,000 cubic feet in 1940 to 851,635,000,000 cubic feet in 1941, an increase of 18.8 per cent. This is an all-time record increase for this class of consumption.

Sales of manufactured gas for industrial purposes rose from 61,768,000,000 cubic feet in 1940 to 79,466,000,000 cubic feet in 1941, an increase of 28.7 per cent. This establishes another record-breaking increase.

Total gas sales reached a new peak of more than two trillion cubic feet.

In the household use of gas, such as cooking, refrigeration, house-heating, water heating, etc., manufactured gas companies sold 264,893,000,000 cubic feet, a decrease of 0.9 per cent for the year. Gas consumed for house heating registered a decrease of 2.8 per cent. Sales of natural gas for domestic uses, including house-heating, also registered a slight decrease, falling from 419,532,000,000 cubic feet in 1940 to 417,216,000,000 cubic feet in 1941, a loss of 0.6 per cent.

Preliminary estimates indicate that the total production of natural gas in 1941, including amounts used in the manufacture of carbon black and for field purposes, will reach a total of approximately three trillion cubic feet. Approximately 204 billion cubic feet of natural gas were used as fuel for generating electric power in 1941, an increase of 21 billion cubic feet over the previous year.

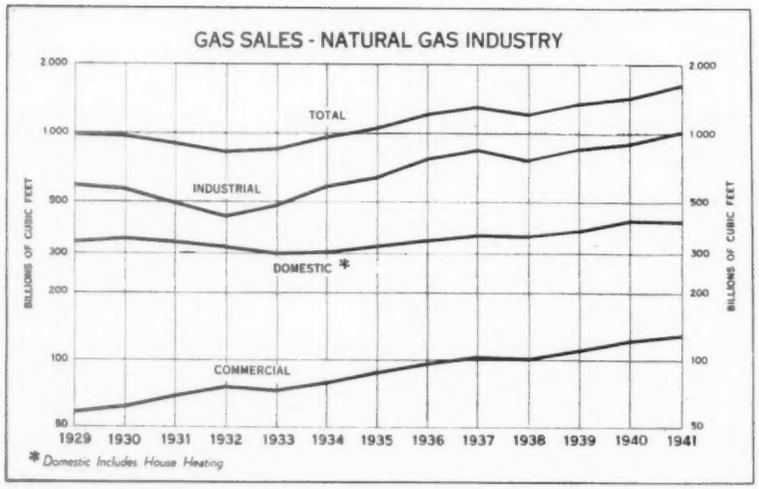
The outstanding development of the year was the phenomenal increase in sales of gas ranges. Total number sold during 1941 was 2,400,000 units—the highest record in the history of the industry, according to the Association of Gas Appliance and Equipment Manufacturers. Actual sales increase over 1940 was 657,500 units, or 38 per cent. The sale of certified performance gas ranges inaugurated in August 1938, has continued to increase to the point where this type of range, tested and approved for unexcelled cooking performance, represents an increasingly substantial portion of total range sales. Some 750,000 automatic gas water heaters were sold during 1941. Furnace, boiler, and conversion burner sales showed an increase of more than 50 per cent. Gas refrigerator sales hit a new high in many localities prior to production restrictions on all automatic refrigerators.

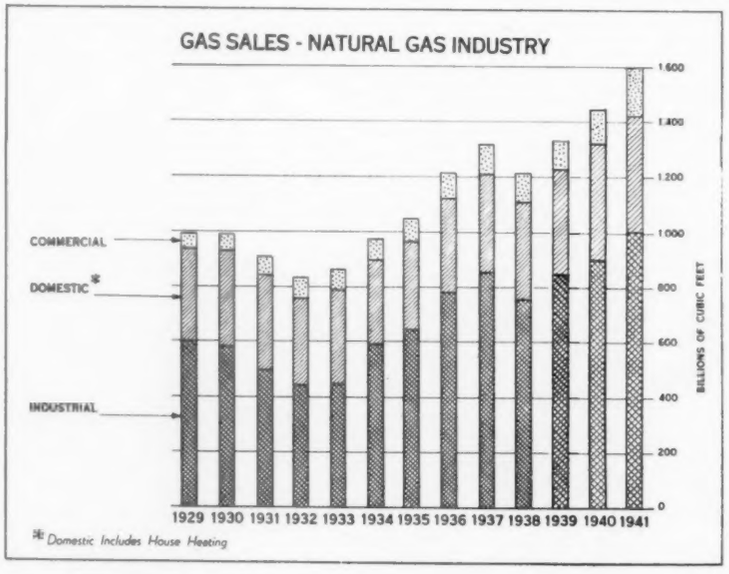
Organization of the natural gas and natural gasoline industries for defense under the Office of Petroleum Coordinator was effected during the latter part of the year. The natural gas industry has now coordinated all of its defense activities with respect to production and transportation, and the processing and manufacture of derivatives of natural gas, including natural gasoline, liquefied petroleum gas, carbon black and re-cycling operations and their transportation. The appointment of Thomas R. Weymouth, one of the nation's outstanding authorities in his field, as consultant on natural gas has been announced by the Office of Petroleum Coordinator.

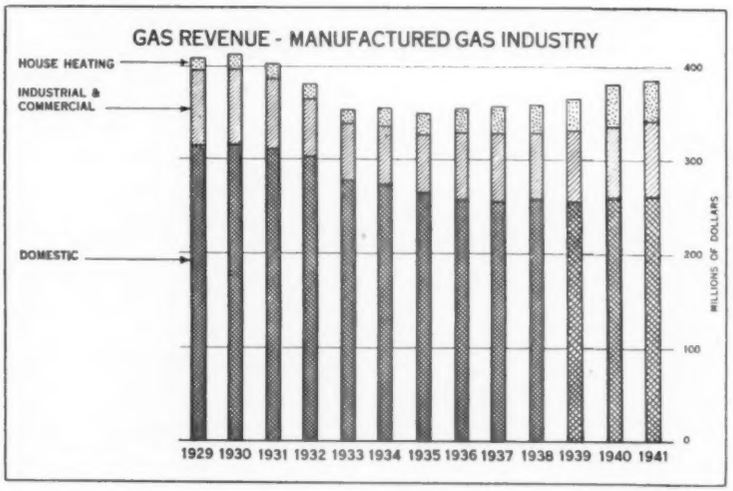
Plans are now underway looking toward bringing natural gas to the highly industrialized Appalachian region from the productive fields of Louisiana, Texas and Kansas, in order to supplement present supply. Natural gas companies situated in the Appalachian area are playing a major role in requirements for fuel under the war program. An 800-mile pipeline from the Monroe field in Louisiana to West Virginia is being planned to make additional quantities of natural gas available to Cleveland and vicinity.

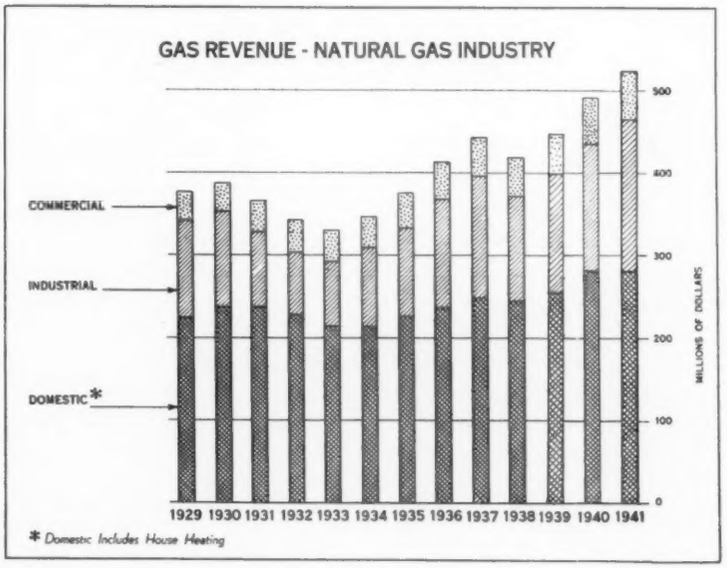
In the nation's all-out defense effort, gas fuel has stepped forth in factories, plants and shops as the antithesis of bottlenecks and all the term implies. Today the gas industry is playing a far more extensive and vital role than was possible in the last war. New large-scale heating processes and methods have been evolved and developed which when applied to the instruments of modern warfare, make certain the superlative equipment demanded by the Army, Navy and Air Corps.

The modern tank—a mobile fortress — affords a good illustration. Gas is used for some fifteen different heating operations in hardening the all-important armor plate which must be hard enough on its outer surface to offset artillery fire and sufficiently tough and resilient on its inner surface to prevent shattering. To approach this quality of product









in the last war would have required a heating cycle of from 400 to 600 hours in length. Today, a far superior result can be accomplished in about 100 hours, thanks to extensive technical research.

In today's modern American shipyards will be found gas-operated furnaces varying in size from an ordinary shoe-box for soldering and rivet heating, up to the size of a 5-room house for the annealing of a complete gun turret 50 feet in diameter, weighing 40 tons, and operating at 1,200 degree temperature. This operation extends over a period of hours and uses more than one million cubic feet of gas for each anneal. Furnaces of this type are the largest in the world, and when not in use for annealing, they are equipped with gas-fired unit heaters and used as a shop.

Shipments of gas-using equipment for industrial use are at a peak. Firms producing this apparatus are expanding and rapidly going on a 24-hour operating schedule.

From giant open hearth and reheat furnaces in the nation's great steel mills to the tiny torches used in making delicate instruments for bombers, industrial gas equipment is setting a pace that is speedily helping to produce munitions of every character. The demands of the hour —speed of production without compromise of quality—are being met successfully wherever industrial heating operations utilize gas fuel.

A few of the thousands of ways in which gas fuel is used to implement and accelerate the war effort are:

The hardening and drawing of projectiles and gun barrels, annealing cartridge cases, stress-relieving gun turrets, forging aluminum airplane propellors, carburizing engine parts, melting glass for the manufacture of optical range finders, heat-treating horseshoe nails for the cavalry, manufacture of textiles for the armed forces and the making of silk cloth for parachutes.

In army camps, projects and commercial establishments serving soldiers and defense workers, gas is used in rapidly increasing amounts for cooking, water heating, space heating and sterilizing. Restaurants, hotels, clubs and bakeries continue to install new streamlined gas equipment. Appliances for specialized cooking are coming to the fore, supplementing the gas range with deep fat fryers, individual deck baking and roasting ovens, coffee makers, toasters, radiant ceramic broilers and many others.

Public acceptance of tested and approved gas ranges, water heaters and other equipment has become so extensive that today more than 95 per cent of all gas appliances sold in the United States and Canada display the approval seal of the American Gas Association's testing laboratories. More than 200 municipalities now have ordinances permitting only approved gas equipment to be installed within their limits.

Records of the Bureau of the Census show that since the establishment of the laboratories 16 years ago, accidental deaths resulting from gas poisoning have decreased 50 per cent. Moreover, during the same period, operating efficiency of household gas appliances has increased from 25 per cent to 50 per cent.

Greatly increased demands for approved equipment for newly constructed army camps, defense housing and other projects were major influences in expanding testing operations during the year.

Strong acceptance of gas fuel and modern gas appliances continues in slum clearance projects and national defense housing. Out of 355 completed slum clearing projects, 311 use 111,211 gas ranges for cooking. More than 50,008 gas ranges are also installed in 163 of 193 completed defense housing projects. Eighty-seven thousand dwelling units of both classes of projects use gas for water heating and 67,000 units use gas for space-heating.

Some 700 operating gas companies continued for the sixth consecutive year to sponsor a national advertising program supplemented by local newspaper advertising. Advertisements on the modern gas range and on the four main household uses of gas fuel appeared in national consumer magazines. Sixteen magazines serving the trade and professional fields have carried advertising promoting the commercial and industrial use of gas. For the first nine months of the year, strong appliance-selling campaigns utilizing newspaper advertising were conducted by local companies.

THAT DEMONSTRATION PAYS...

S. J. BEALE
Photo, Blank & Stoller

NATIONAL DEFENSE and The Gas Industry

By
S. J. Beale
General Manager
West Gas Improvement Co., Inc.

THIS SUBJECT, as applied to the U.S.A. is uppermost in the minds of American Gas men who are wondering just how far to go under present conditions and to what further extent in the event of a state of war.

You have asked me to be of some help; and I think you should know that I have no direct information from Britain, but that such information as I have has been gathered from published information released in the British and American Technical Press and from British Government publications, as well as from various American Gas Association releases, etc.

It might seem strange that with my own Company, whose headquarters are in England, and which has built plants all over Europe, also that my chief, Sir Frederick West, as coordinator of munitions in the North of England and now President of the Institution of Gas Engineers, and my own family, being subjected to bombings over there, I have no direct information. The reason is that the English have taken on themselves an individual duty of censorship, and again the censor is also very strict. I do not even know the extent of my own Company's activities in this war except that they are working very much along the lines of the last war, but very much more efficiently.

It appears to me that there are three main considerations, and in their order of importance they are:—

1. **Sabotage—act now.**
2. **Prepare now to safeguard gas supply before and in case the U.S.A. becomes actively engaged in warfare.**
3. **Additional preparations required should the U.S.A. become actively engaged in warfare.**

Presented at Meeting of Mid-Southeastern Gas Association State College, North Carolina, November 13, 1941.

Sabotage—Act Now

At present this is the matter requiring immediate active attention. Measures to be taken depend partly on the type of population, also if large war-material producing plants are in the area you will wish to ensure continuous supply to all of them. I would remind you that in World War I an Act of Congress was passed involving a fine of $10,000 or imprisonment for ten years for acts of sabotage against Public Utility Properties and it has recently been amended to cover present conditions.*

The Federal Bureau of Investigation has done much work, and has issued a confidential booklet which some of you may have seen. This organization is prepared to assist you, and you might wish to call in the local representative to talk things over.

Earlier this year the American Gas Association Technical Section appointed a committee, of which I was a member, to draw up a questionnaire concerning this whole problem; and it was also of an informative nature. I am sure you have all seen it.

Concerning one item, I heard of a company which was so careful that it had fences within fences; and the local fire department complained its access to the plant, if called, would be greatly hampered. Careful perusal of this questionnaire will be very valuable to you.

I understand 70% of all meters have replied, and only 17 companies did not reply either because it was their company policy or because their State Civil Protection Commissions did not recommend it. It was confidential and no details were released outside the Statistical Department of the A.G.A. which tore it up when tabulated.

"Gas Age" of July 17, 1941, page 24, gives information and photos of protective measures taken against Sabotage by Consolidated Edison of New York.

**Utility Regulation and National Defense —Report of the Committee on Progress in Public Utility Regulation—National Association of Railroad and Utility Commissioners, December, 1940.*

Prepare Now to Safeguard Gas Supply Before and in Case the U. S. A. Becomes Actively Engaged in Warfare

I wholeheartedly agree with Major Strickler who told the A.G.A. Distribution Conference in Pittsburgh, Pennsylvania, in April last,

"I do not join with those who expect an attack from without in the very near future; but it would be folly for us to cover our eyes to what is happening elsewhere throughout the world, and merely say "It Can't Happen Here." Let us be far-sighted and not be caught napping. We should make every preparation possible for the protection of our plants and properties should an outside attack occur. Already a number of companies are working on plans that can be put into immediate effect should such an emergency arise."

I know there is some opposition to this and a general rule can be taken that the resistance is greatest at the geographical center of the U.S.A., gradually diminishing in direct proportion to its distance from that center until the four borders of the country are reached, where all should

give special thought to protection, and especially you here in the East, also those on the Pacific Coast.

At the suggestion of the A.G.A. I wrote my chief, Sir Frederick J. West, a request for a qualified English Gas Engineer to come over here or write a paper to explain to the American Gas Industry what is being done in the British Gas Industry in War time. The question was taken up with the Council of the Institution of Gas Engineers, and their apparently unanimous opinion was the problem is so vast and comprehensive, involving not only physical preparations but also certain legal and governmental control and rulings over the industry, that such a suggestion is hardly feasible. All this was considered with the desire to be of the greatest possible help to the American Gas Industry. It must be remembered that some information relating to camouflage and certain specific Air-Raid Precautions will not be allowed out of the country by the British Censor.

Their suggestion is for delegated members of the American Gas Industry to go over there and obtain first hand information, which can be applied directly to American conditions. In this the British Gas Industry wishes to be of the greatest possible help. Recently some members of the National Technological Civil Protection Committee, which was appointed by the Secretary of War, returned from a visit to Britain, where they went to find out at first hand what is and has been going on. They had with them a series of questions drawn up by the Technical Section of the A.G.A., and are back in the U.S.A. with the answers. The Chairman of the Committee is Mr. Walter D. Binger, Commissioner of Borough Works, New York City. You may know that Mr. W. Cullen Morris, Vice-President of Consolidated Edison of New York represents the A.G.A. on the Committee; he did not go to Europe. The answers are in the hands of the War Department.

Additional Preparations Required Should the U. S. A. Become Actively Engaged in Warfare

You will have to differentiate between what you will do now and what you will leave to be done later. The essential thing is to make *all* your plans now—and in considerable detail—so as to have your staff and employees properly trained, and your plant in good condition, as well as having a good supply of spare parts on hand.

I know of one Gas Company in which each departmental head wrote down, as completely as possible, a set of empirical questions and later answers on these subjects. After discussion and editing the whole thing will be set up as a guide book to be followed now or as necessity arises —a very good idea too.

The following notes are for your general information and guidance only, to show how others have planned and some of the things they have done. Some adapted to U. S. conditions will be useful to you. Each man has a different set of problems but many are essentially the same in principle and different only in detail.

Whatever you do *don't* be caught napping or you will pay a terrible price.

Many expenditures you make will not be lost, but represent plain good peace time practice.

Books and Pamphlets

The British Government has issued a large number of booklets and pamphlets on Civil Defense, including many subjects such as schooling, health, medicine, evacuation, training A.R.P. personnel, decontamination of clothing, A.R.P., fire-fighting, transport, protection of food from poison gas, lighting restrictions, neurosis in war—which surprisingly enough is said to be less, various Standing Rules and Orders, and others.

Three hundred and eighty-two of these as of April 20, 1941 are listed by the British Library of Information in Rockefeller Center, New York City, which may be purchased there or by mail, varying in price from 5c to $1.75 each delivered. You may have a list from which to make your selection by writing them for it. It would appear that perhaps 80 or so are of direct interest to the Gas Industry. It is of special interest to note that many Civil Defense and A.R.P. publications were printed and available as early as 1935, 6, 7 and 8. There are also listed four sets of lantern slides showing bombings of Shanghai, Spain, Finland and Poland.

The printed list shows by asterisks that ten have been put together in book form, 296 pages, by the Chemical Publishing Company, Inc., Brooklyn, New York selling for $3. The pamphlets are cheaper ($1.30) but the book is convenient. You would be well advised to get either the pamphlets or the book before going too far ahead with your plans.

Chemical Publishing Company have also printed another book for $1.50. It is somewhat similar to a British Library of Information one for 30c, and its title is "War Gases, the Detection and Identification of—Notes for the Use of Gas Identification Officers"—1st Edition 1940 (34-273) Brit. Lib. of Inf., No. 152.

A large book "Civil Defense" by C. W. Glover—Chapman & Hall Ltd. London—3rd Edition was shown to me at the B.L.I. as was "Civil Air Defense" 334 pages by A. M. Prentiss—McGraw Hill. Both appear to be largely reproductions of British Government Booklets.

The Province of Ontario, Canada last year published a Manual of Organization and Instruction for Civilian Defense which is partially quoted in F. H. LaGuardia's Preliminary Report for Civil Defense Organization and Administration in the United States, submitted to the President earlier this year.

I have perused a considerable number of booklets and papers on Civil Defense, but for Gas Company protection I am quoting largely from a paper, "Air Raid Precautions" by R. J. Bennie M.C.E., Mech. E., Research Engineer, Metropolitan Gas Company, Melbourne, Australia reproduced in the July 1941 issue of the Australian National Gas Bulletin.* I am doing this because Mr. Bennie has made a fine presentation to the Gas Industry and his remarks are very apt for this country, as neither Australia or the U.S.A. has so far experienced air-raids, and it is obvious each should be prepared for the eventuality. You will later hear me quote Mr. Bennie and you will know to whom I refer.

Air Raid Shelters

Shelters should be disposed around the plant so that employees are not exposed to machine-gun fire, etc., when going to them. Corners of buildings can be used, but see that the walls are not likely to fall on them. Long shelters should be zig-zag to hold not more than fifty people, and if more they should be subdivided. Employees of similar trades and employments should not all be in one shelter. No steam, gas, compressed air, etc. pipes should pass through.

Mr. Bennie says "Shelters should be reinforced rectangular passages, ventilated mechanically, air being drawn from a high vent and exhausted along a zig-zag passage. The

**Printed elsewhere in this issue of the Journal.*

entrance should have two air tight doors to act as a lock in case of gas attack. The outer door should be very strong and should open *inwards* so that any debris falling outside will not prevent egress. These doors, whether above or below ground, should be sandbagged, and spaces between bags filled with sand or oxide, which is denser, to assist against "blast," and as protection against flying splinters, as should all exposed surfaces. Specially tarred paper bags, weather resisting and of reasonable life, are now obtainable." The two doors should be at right angles to each other to prevent splinters entering the shelter. If gas is expected proper decontamination rooms would be at the entrance. There should also be another means of egress in case one is barred by debris. Windowless shelters are best.

Mr. Bennie suggests "Lighting should be by electricity and kerosene lamps. There should be seats, food, first aid equipment, and a gas-mask locker. All large shelters should be connected by telephone and to observation posts. They should also contain sanitary facilities.

"In small gasworks where raids are unlikely to last long, trenches three feet deep, with earth piled on scrap laid across are satisfactory, occupants lying down on boards. Some shelters can be camouflaged with coal or coke piles."

Shelters hermetically sealed require 35-50 cu. ft. of air per person per hour. Filtration units deliver not less than 180 cu. ft. per person per hour and have auxiliary manual operation. A slight positive pressure would prevent gas coming in. A person resting or in a shelter emits 400 B.T.U. per hour of sensible heat and heat of evaporation, the sum of which is constant. A first class underground shelter has a layer of 4 feet of reinforced concrete on top of 20 feet of earth under which is 4 feet of reinforced concrete.

Shelters 75 feet deep are rather safe from H.E. Bombs and earth shock, but this depth has a very bad psychological effect on people if for extended periods and extensive use of such shelters are said to be excellent allies of Hitler if practiced freely.

There is *no* practical means of combating a direct hit with H.E. Bombs unless all take to dwelling in the bowels of the earth. For a 500 lb. bomb falling not less than 50 feet away the following conditions are required to combat it:

Steel plate	1½" thick
Unreinforced concrete	15"
Reinforced concrete	12"
Sand or earth	2'-6"
Ballast	2'-0"
Strongly built brick wall	1'-2"

To overcome incendiaries floors may be covered with "Durasteel" plates, and roofs should be covered with 4" to 6" of concrete, which will also take care of bomb splinters.

Dining room tables may be covered with a steel cover and sides as an air raid shelter in the home.

In a book "A Practical Policy for Air Raid Precautions" by Serge Chermayeff, F.R.,I.B.A. (Frederick Muller, Ltd., London, 1939) it is said concerning evacuation, that London's women and children, aged and infirm represents 30% of population and suggests large open workshops should be sub-divided against bomb splinters and blast.

In a book "Common Sense and A.R.P." 1/—or about 25c—Major C. H. Foulkes (C. Arthur Pearson, Ltd., London 1939) said Barcelona had only 5-600,000 out of 1¼ million under cover from bombs, including cellars in private houses. Only 30,000 of these had cover from any kind of bomb then existing. He suggested if there were shelters for all from 500 kilo bombs, then 1,000 kilo bombs would come. You and I know they are already here.

Air Raid Alarm

At the first alarm, "Roof Spotters" should go immediately to the roof. Britain has two systems of alarm, one by telephone to A.R. Wardens and other key persons, and the other by sirens to the general public. *The telephone system is:

Preliminary caution—A.R. Message —Yellow
Action warning — A.R. Warning — Red
Raiders passed — A.R. Message — Green
Cancel caution — A.R. Message— —White

Sirens give different types of blasts for the various conditions required to be known by the public. When telephone operators say "Yellow," "Red," etc., wardens and others know the meaning.

Whenever possible people should take cover within five minutes after the first alarm.

Air Raid Precautions Scheme

A general scheme must evolve somewhat as follows:

Organization and Control
Maintenance of Supplies
Protection of Workers
Warnings and Communications
Lighting Restrictions and Concealment
First Aid Arrangements
Fire Precautions
Decontamination of Material

The following includes quotations from Mr. Bennie.

*Memorandum No. 8. The Air Raid Warning System. B.L.I. No. 104—10c.

Office Building and Laboratories

Paste cloth on windows—in pattern form, and block up unused doors and windows. Special steel shutters to be put up inside are available. Keep duplicates of important records elsewhere. It is a good idea to place sand on all possible roofs to prevent excessive damage by incendiaries, and where possible to strengthen floors to help them take the additional load of fallen debris. Protect roof glass with ½" wire mesh underneath.

Electric Power Supply

Duplicate lines are very desirable and lighting circuits to be blacked-out in a raid should be separated for convenience. Special dim air-raid lamps could be connected to power circuits.

Fire Fighting

"Dirty (unpotable) water" mains should be laid, shallow is alright, to nearby streams and gas holder tanks. They should be easily available to the Retort House. Auxiliary fire-fighting squads must be organized and trained after consultation with your local fire department.

A book "Fire Defense" by the National Fire Protection Association, 60 Batterymarch Street, Boston, Massachusetts, 1941, 219 pages is available and covers such matters as:

Incendiary Snuffers
Maryland Defense Plan
Massachusetts Fire Department Inventory
Fire Department equipment so that it may be mobilized quickly for Emergencies.
Fire trailers—pumps
Auxiliary Fire Brigade training

Boilers, Power House and Boosters

Some of Mr. Bennie's suggestions —Doors and windows should be protected by sandbags. Important machinery should be protected from flying fragments, and sandbags should be placed between machines to prevent hits on one machine from injuring another — all this because roofs are usually not sufficiently

strong to stand reinforcement with heavy dead loading.

Fit boilers with automatic feed-water regulators, or have indicators fitted in places operators would shelter. In a raid slow down boilers and bank fires.

Arrange proper valving and sealing to isolate equipment and gas steam mains, etc.

Stop boosters and have exhauster suction gauge in place where operator takes shelter.

Sandbag power-house walls 8 feet high if they are not heavily built.

Retort House

A direct hit on a retort house might cause much havoc, and there appears little to be done except take care of the result as well as possible; and of course the foul gas vent would be opened if necessary as well as if the exhauster was stopped.

The following is the procedure on Glover-West plants. On receipt of an air raid warning, generally, Glover-West vertical retorts can be kept running with the minimum exposure of the men if the following rules are observed:

A) On receipt of the "Yellow warning" which is a preliminary warning not given to the general public, the following precautions are taken:

1). Discharge all coke from the bottom mouthpieces. This should be done as rapidly as possible and the coke should be taken the quickest way to the yard or, in certain cases, allowed to fall and remain on the retort-house floor:

If the Yellow warning is given 3 hours or more after charging producers, one skip full of fuel should be charged to each producer.

2). Fill all coal-feed hoppers.

3). Close up all scurfing retorts to minimize risk of fire on the top-of-stack.

4). Stop liquor or tar circulating pumps.

5). Check the shielding of all lights to comply with the Black-Out Regulations.

6). Inspect Safety blow-off device.

B) On receipt of the "Red warning" which is an action warning that an attack is imminent and is made known to the public by sounding sirens, withdraw all men from the retort house to the shelters. If possible a one-man shelter should be provided in the retort house at ground level as an observation post.

Under these conditions the retort house may be left without attendance for from 1½ to 2 hours.

Waste-heat boilers should be left in operation. Provided the feed-water control is in good working order, there should be no need for personal attention during a normal raid period of say 2 hours.

If the interval between the Yellow and the Red warnings exceeds an hour the discharge of coke and the filling of coal-feed hoppers should be repeated at intervals of not more than one hour.

If gas consumption is likely to be reduced during air raids, (as for instance in districts with a large industrial load), arrangements should be made to reduce the make of gas, by reducing the speed of coke extraction and the supply of steam to the retorts on receipt of the Yellow warning.

All men should be carefully and exactly instructed what operations each has to carry out when the emergency arises. To avoid confusion and danger, the number of operations should be reduced to the minimum.

Safety blow-off devices must be examined and tested every day.

Where retort houses are lighted by gas, the supply to all lights including by-passes, should be cut off, preferably from the ground floor, when the men are withdrawn.

The foregoing observations are, of course, susceptible to modification to suit local conditions.

The question of chimney glare in black-outs has been raised, and cowls have been added to chimney tops. If there are unburned gases, care should be given to bench heat adjustment to prevent excess CO passing to waste-heat flues; or main producer gas dampers may be closed a bit. To reduce excess heat in chimney interior, steam may be put into chimney bases.

I heard fairly recently that not one Glover-West retort has been hit up to now. This is rather remarkable when you realize that approximately one-third of all gas made in Great Britain is made in Glover-West retorts.

Coke Ovens

A certain amount of reflected light on black surfaces can't be seen from the air, as explained in an article "A.R.P. for Coke Ovens" in the English Gas World of August 5, 1939, page 17. Another article on Coke Oven anti-glare appears in the April 26, 1941, issue page 205.

Water Gas

I have not seen anything recently on Water Gas plants. Towards the beginning of the war it was considered best to shut them down completely. This may still be the best method.

I now quote Mr. Bennie again on a number of subjects.

Coal Stores

Keep coal stored in more than one place if necessary and protect crane cabs with ¼" steel plate to ward off small missiles.

Condensers and Washers

Sand-bag where possible, especially those not very high.

Purifiers

Nothing much can be done—keep fire hose handy.

Tar & Liquor Well, & Oil Storage

Don't keep too much stock — especially in one place, and have plenty of wet sand and foaming equipment handy.

Gas Holders

In England all waterless holders have been deflated "for the duration" because of the possibility of an explosion. On the other hand no holder has exploded, and many have been badly hit.

It's a good idea not to have holders too full, as if they are hit, flames may ignite nearby structures. Many medals have been awarded British gas men, and many have been for bravery in action on ignited holders.

For immediate temporary repairs wood stoppers, asbestos pads, corrugated sheets and wet clay are used. Later more permanent patches are put on by electric welding of patch plates, or bolting on plates with split and various types of bolts. An advertisement in the English Gas World of August 23, 1941, page IX claims the Oxley Company by "metal surgery" of Arc Welding patched a 1½ million holder with *430* patches. In the same issue of the magazine, p.p 81 and 82, are shown various types of special bolts used for holders and purifier repair. For other reference see below.

Camouflage of holders has taken a new turn. In some cases large cones have been put over crowns to shed incendiaries and small missiles.

Color should always be matt and dull although trees, flowers, etc., (in season), and other strange devices have been painted on them as camouflage, and should blend the holder into surrounding scenery.

Sometimes holder crowns have large rectangles painted on them to match the surrounding ground as camouflage.

As with other structures, it is well to surround holders with sandbags to prevent piercing lower levels with bomb splinters and help deflect "blast."

Ref :— Extinguishing gasholder flames and patching holders—English Gas Journal, April 2, 1941, p. 15.

Arc welding bombed holders—English Gas World, June 28, 1941, p. 322.

A British Government Bulletin—"Sandbag Revetments. Notes on the Construction, Maintenance, and Replacement of," 5c—B.L.I., No. 146 says that bags should be battered 4:1 and rot proofing creosote and creosote emulsion and tar distillates used on bags—specification below.

Creosote 30-40% come over up to 210°-230° C. and 30% at 260° C.-290° C. and should contain 10-15% phenols up to 270° C.

Concerning the holder tank if it should be hit, Mr. Bennie has suggested channels should be dug to lead off water so that it does not flood important plant.

Spare Parts

Disperse spare parts around the works so that not too much of the same materials are near each other. Duplicates of important items are necessary. Spare parts can be kept in old buildings, as they cannot be seen as easily from the air. In the case of damage salvage all good parts.

Gas and Other Mains at Works

Look over your valving and see if it meets emergency requirements, also water seals. If not, act now. Prepare bagging holes at suitable places. The English Gas Journal of November 16, *1938*, p. 560 shows a good system. You might paint your inlet, outlet and bypass valves different colors for quick identification.

Keep handy spare lengths of mains to use if overhead mains are hit, also bent plates and clips to fit over mains which have been pierced, and keep wet clay and wooden plugs handy.

All mains should be properly mapped and maps should be accessible to proper employees who should be told where all mains, valves, seals and bag holes are and of course these should be easily accessible. Controls such as valves, etc., should be frequently tested to see that they are in proper working order.

All vulnerable mains, steam, water and other pipes, cables, etc., should be protected or duplicated as well as valves and suitable by-passes installed to take care of emergency conditions.

Protecting walls should be 14" thick and 4'-16' high.

Roads within plants may be outlined in paint as a help during blackouts, as no works lights should be seen from 1,000 feet up. There are a number of different color luminescent paints used on curbing, road crossings, fire plugs, lamp standard bases, etc., which are luminous when a small ultra-violet lamp is focused on them.*

All plant, office and other gas employees should be provided with steel helmets—especially those who do emergency repair work, fight fires, patrol, etc.

District Gasholder Stations

Two men are required unless there are patrols outside. The use of barbed or electric fences, special patrols or the electric-eye may be used against sabotage.

Sandbagging of doors and windows is necessary. Duplicate electric supply to boosters should be installed and mains leaving valve rooms should be fitted with quick acting valves or seals at least 50 feet from the building, so that if the valve room trunk is fractured, mains will not feed gas back to the fracture. Roofs are always a weak point. Valve rooms must be protected from a flood which would occur if the holder tank were burst by a bomb.

Distribution Mains

Generally a bomb crater, depending upon the bomb size, would not be less than one-third of the width of the street, larger in macadam and possibly smaller in concrete. Depth would probably be at least 5 feet. In addition to visible damage to gas and other mains there may be fractures in mains unexposed in the immediate crater. Adjacent buildings should be checked for leaks and possibly probings made for using leak indicators.

There is frequently the danger of a broken water main being in the same crater as the gas main, in which case water may enter the gas main and block off gas as well as build up pressure in the main. Where possible gas and water mains should not be laid too close together.

After debris has been cleared from the crater it would be possible to insert by a spear bar one of those conical stoppers described in the English Gas Journal of November 9, 1938, p. 451. A stock of different sizes should be carried on each emergency truck. Smaller leaks would be filled with clay.

Mr. Bennie says "A very good substitute for a valve is a device used recently by Mr. H. E. Grove. The top of the main is slotted half way around and a flanged extension is carried up. When it is desired to block the main a diaphragm is pushed in with a piece of square packing stretched around its periphery. Tests on these showed them to be quite tight. They are cheaper than valves and would fulfill the requirements of emergency measures. A number should be installed in vital positions on important mains, such as on the approaches to bridges, and on all trunk mains near valve rooms.

"In England some engineers have installed 'U' bends in pipes so as to form seal pots and these have been connected through stop valves to nearby water mains, for instant use. These are, of course, perfect gas seals, but do not in my opinion answer the problem of stopping the flow of water along the main. Mr. Grove's diaphragm would do so, provided the bottom of the pipe was kept clear of scale and dust at this point. The device would probably take the form of a casting inserted between lengths of main and covered by a rectangular road cover. Emergency road trucks would carry a stock of assorted sizes of diaphragms."

Mr. Bennie points out the difficulty of complete valving off a low pressure system, block by block, and suggests drilling and plugging with stiff clay or mortar from a special syringe. You may remember grease was used in this way in Philadelphia as explained in the American Gas Journal of July 1941, page 27, and A.G.A. Monthly July-August 1941, page 258. Periodic testing of valves is important.

Incidentally it is important for men working in craters to wear gum boots and rubber gloves where loose electric wires may show up. Where necessary allow escaping gas to burn all night. Fire Department will help to pump out flooded mains, but in such cases services must be shut off.

War Time Building Bulletin No. 12—Emergency Pipe Repairs (15c) B. L. I. No. 193.1 describes various pipe jointing materials—all or most of which are known to you.

(Continued on page 42)

**Technical Bulletin C17 (of luminescent materials) giving an analysis of existing materials and their uses, or non-use, may be obtained free—in Britain anyway—from the Ministry of Home Security, Research and Experiments Department, Forest Products Research Laboratory, Princes Risborough, Aylesbury, Buckinghamshire, England.*

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THAT DEMONSTRATION PAYS...

Building Industry Cooperation Policy of The Hartford Gas Co.

A PROGRAM of complete cooperation with the home building industry, adopted as the result of a market survey made a little over two years ago is today netting returns in the form of new gas load to the Hartford Gas Company that could hardly have been envisioned at the time the management undertook the analysis.

Due to its location in the center of a vital defense manufacturing territory, Hartford has drawn new residents by the thousands from every state of the union; and the unprecedented demand for shelter has given building operations in that area a boom characteristic that is sometimes likened to that existing in Washington, D. C.

But at the time the gas company resolved to analyze its position in relation to the house heating load, emphasis was still being placed on the normal home building activity and the concern of the sales department was with their conviction that gas was not winning its share of new residential heating.

In brief, the survey disclosed a number of factors that were ripe for correction. The first of these was that too much emphasis was being placed on signing up the high priced homes, and not enough in cooperating with the builders of moderate to low-priced dwellings. Local F.H.A. officials were found to be lukewarm to gas, particularly for heating. Misconceptions regarding the cost of appliances and the cost of the fuel were abroad, and the additional security value of an all gas home as a long time mortgage investment was being generally ignored.

Gas rates, however, were found to be generally satisfactory, and it was decided that there existed no necessity to adopt lower house heating rates in order to secure a greater share of this type of business.

The first move on the part of the Hartford Gas Company was to establish its own policy of building industry cooperation, and then to tell the building industry about it. The keynote of the telling was sounded by Charles W. Kimball, Manager of Sales Promotion in a talk with assembled contractors, builders, real estate developers and F.H.A. officials when he said, "We haven't asked you to come here to tell you why you should work for the gas company. We are here to tell you why it is good business for the gas company to work with you."

B. H. Dingley Jr.

To the developers he pointed out that the company appreciated their problem as far as the fuel for a speculatively built house was concerned. They had to be able to build and equip the home as cheaply as they could by using any other fuel, and they had to be able to sell it quicker. To enable them to accomplish the former, the utility had already employed two new construction specialists whose function was to work with builders and owners, advising them on any problems relative either to gas or the equipment to utilize it.

F.H.A. mortgage insurance officials are of course primarily interested in the structure and equipment of a dwelling as a sound, easily liquidated, risk for a long term amortizing mortgage investment. To them was pointed out the long life of gas equipment, the freedom from both service and replacement costs, all of which tend to lighten the burden on the buyer and enable him to keep up more easily his payments.

To keep the sales department abreast of all new construction in the territory served by the Hartford Gas Company, the new residential sales effort, under the direction of B. H. Dingley, Jr., Manager of Appliance Sales, was geared to the use of Dodge Reports, a construction news service that issues daily reports on all types of new building in any given area. In addition to the original two new construction specialists, two additional men have since been added. Architects, builders, contractors and owners, as listed in the report service are now contacted on every job that is listed, even as early as the "contemplating building stage."

The result of this whole activity was that even before defense housing had begun to crowd every other type of residential construction out of existence, homes in the low cost brackets were turning in increasing numbers to gas for heating, cooking and automatic water heating. The two major government defense housing projects nearing completion in the early fall of 1941 are using gas 100 per cent for cooking, and of a total of 1,500 dwelling units all but 200 are being equipped with automatic gas water heaters. The 200 exceptions are being served with hot water from a coal fired central heating plant.

Of the prominent builders who have switched their operations to lower priced homes, the first in the field was Ansel Arnold of East Hartford. From March to May of 1941 he sold 40 homes at $3,900, all of which were gas heated, and used gas for automatic hot water and for cooking. This builder is now embarked on a project for the construction of 27 more homes in the under $5,000 class.

The Milbrook Park Company, the only builder in the Hartford area building under F.H.A. Title VI has built and leased 50 homes, and has plans that embrace the eventual construction of 500 houses. The Milbrook homes are sold only with automatic gas water heaters installed, and the choice of fuel for cooking and heating is left up to the tenants. Aggressive promotion and follow up of all new occupants of the completed homes has resulted in 95 per cent of the cooking load being won by gas.

Forty-eight new dwellings are being started by Chas. Herman and Sons., for employees of the United Aircraft Co. All will sell for less than $5,000 and all will use gas for heating, cooking and automatic water heating.

(Continued on page 41)

They've done it!
Into the bleak December sky, on a momentous morning in 1903, soared the Wright Brothers' first plane. It flew only 852 feet, stayed aloft only 59 seconds. But it demonstrated the fulfillment of a dream old as history . . . that man would one day find wings.

. 1941, Harper-Wyman Co.

Nothing convinces like demonstration

WHAT ELSE inspires such confidence in a salesman's words as *proof* that he is right? Why not *show* your customers what the modern gas range can do? Let them see the performance of the finest cooking unit ever to be engineered . . . the Harper Burner System.

This responsive control system shows your customers modern cooking at its best, with Harper's patented "2 burners in 1." Actual demonstration *proves* the time-saving speed of the STARTING BURNER, and the multiple savings of the tiny, efficient COOKING BURNER.

Experience will prove that a Harper-equipped range connected to gas is your most valuable "salesman." Watch sales CLIMB when you *demonstrate* that "Gas does it best!"

HARPER BURNER SYSTEM

DEMONSTRATES THAT "GAS DOES IT BEST"

HARPER
BURNER SYSTEM

TURN THIS PAGE FOR PROOF THAT DEMONSTRATION PAYS...

When your customers see this display

YOU'LL SELL MORE GAS RANGES!

SHELLANE GAS SERVICE

F. L. ROY & SON - HARDWARE
SHELLANE DISTRIBUTORS
Phone 88
Le Roy, Minnesota

February 5th, 1941

Harper-Wyman Company
8562 Vincennes Avenue
Chicago, Illinois

Gentlemen:

I thought you might be interested in my story. About two months ago I purchased a "Round Oak" gas range for my mother, and it had what I understand is known as the Harper Burner System.

Several weeks ago I happened along in the kitchen on maid's night out and started to play with the top burners. Of course, I knew all about the Harper principle, but this was the first time I "demonstrated" for myself.

Well, to make a long story short, I figured it would be a good idea to connect a range on our appliance sales floor so the men could actually demonstrate how modern burners work. Stop in some time when you are near our store and I'll show you some real sales figures.

Very truly yours,

F. L. Roy & Son

By Joe F. Roy

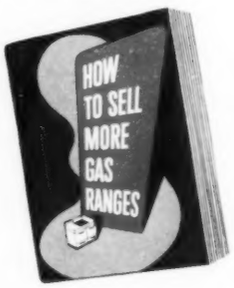
A SHELL PRODUCT

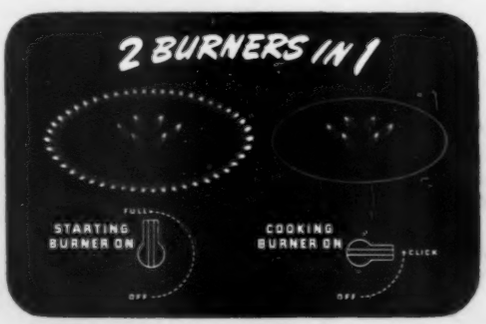
— for just a few cents a day

SEEING IS BELIEVING!
Look! Both ranges are keeping water boiling! But the modern range, equipped with Harper Burner System, is using only a fraction of the gas being consumed by the old fashioned range!
CUBIC FEET
CUBIC FEET

THIS convincing demonstration quickly shows your customers how much fuel the Harper Burner System saves. The meter hands which indicate the comparative quantities of gas used by an old-fashioned range and a modern, Harper-equipped range — when each is doing the same work, keeping water boiling —offer undeniable proof of the economy of the Harper Burner System!

The simple steps to be followed in setting up this demonstration-display are fully described in our new FREE booklet, "How to Sell More Gas Ranges". The booklet also contains full instructions for organizing eleven additional floor demonstrations which will help you step up the average of your *unit sales* . . . You are invited to send for copies. *Harper - Wyman Company, 8562 Vincennes Avenue, Chicago.*





HARPER BURNER SYSTEM

The Harper Burner System operates on the unique principle of a burner within a burner, "2 burners in 1", both controlled by the same handle. The small* COOKING BURNER *may be operated independently of the* STARTING BURNER. *No other burner in the world offers this advantage.

—one of the standards of top burner performance under CP

Year 'Round Hot Water From Your Heating Plant

By John F. Droge

Brooklyn Borough Gas Company

YEAR 'ROUND HOT WATER from your heating plant is a subject that should arouse considerable interest among this group. However, there may be some hesitancy on the part of some sales organizations to sell this type of equipment. Our experience in this field which is now entering the third year, has definitely proven that summer-winter hot water from gas fired house heating equipment is here to stay. We are about to conclude our most successful year in house heating sales. We feel that this is due in a large measure to the fact that we were able to offer a combined heating and domestic hot water unit to our customers.

Our original opinion that a properly designed and installed heating boiler could produce domestic hot water economically, has definitely been borne out in practice. We have not attempted to sell a boiler that could not meet the minimum performance requirements as follows:

1. With the boiler water temperature set at 180 degrees, hot water delivery should be at the rate of 15 gallons during a five-minute draw period with a minimum water temperature of 130 degrees when the incoming water is at 60 degrees. The gas burners should not come on until about 15 gallons have been drawn.

2. The standby loss should not exceed 6 cubic feet of 540 Btu. gas per hour for a 72-hour test period in an average room temperature of 60 degrees. The above minimum test requirements have been adopted by us and also by the Brooklyn Union Gas Company.

Since our original specifications covering boiler design were developed and put into practice several new boilers have been developed and offered for our approval. Tests and subsequent trials indicate that the following standards in boiler design should not be materially deviated from, if efficiency and success are to be obtained.

1. The boiler must have very good internal water circulation. We refer here to the boiler water itself, which is the heat-exchanging medium. The boiler sections must be so constructed that they offer a minimum of resistance to the water circulation. The push nipples between sections must be large and properly placed. Unless the boiler water circulates freely, it cannot transfer its heat rapidly enough to the hot water coil to provide a constant flow of hot water and inconsistent and inefficient operation will result.

The domestic hot water coil should be an internal coil, that is, it should be a coil immersed directly within the boiler water. This is necessary because external coils are difficult to insulate and are usually beset with circulation difficulties.

3. When an instantaneous coil is used it should have a minimum of 12 sq. ft. of surface and should be so placed within the boiler that it will receive the maximum volume of boiler water circulation within the shortest time.

4. The aquastat controlling the hot water cycle must be placed so that the burner will operate to maintain the domestic hot water temperature without excessive over-ride.

5. The boiler must be adequately insulated. We use a complete covering with three-ply air cell asbestos and then fill with rock wool between this jacket and the metal jacket.

6. The boiler must be adequately sized. On steam jobs 50 sq. ft. should be added to the required radiation of the house for each bathroom where tankless coils are used and 1½ sq. ft. per gallon of storage capacity should be added to the required radiation where tank coils are used. On hot water jobs 80 sq. ft. should be added to required radiation when tankless coils are used and 2½ sq. ft. when storage tank coils are used. There is some difference of opinion regarding boiler capacity allowances for instantaneous coils. Some think that additional boiler capacity is unnecessary where instantaneous coils are used. We do not agree with this viewpoint. We have some installations that apparently are running all right even though the boilers are close to the line regarding the required radiation with no additional capacity for hot water. It is probably correct to assume that the hot water and heating demands will not always be coincident and that the hot water demand is usually only for a short duration of time and that the boiler is sized for zero degree outdoor temperature. If for any reason more than the normal amount of hot water was to be used, such as on a cold wash day, the house would not receive very much heat because the hot water demand will always take precedence over the heating demand on undersized boilers. We do not think it is sound practice to size these boilers without suitable allowances for hot water.

7. For efficient summer operation the volume of water in the boiler should be properly proportioned to the capacity of the instantaneous coil. In other words, a coil having a minimum draw capacity of three gallons per minute at 80 degree rise should not have more than 30 gallons of boiler water capacity. We assume that a boiler with 30 gallons water capacity should not have much greater standby loss than a 30-gallon storage type water heater when the insulation is adequate and the same in both cases. We have not attempted to use an instantaneous coil on boilers larger than 500 sq. ft. of boiler capacity because larger homes usually require a greater volume of hot water than our present coil can produce. However, we are not limited in this and larger coils will, no doubt, be available in the future.

8. The best type tempering valve obtainable must be used with both tank and tankless coils. The tempering valve not only prevents excessive hot water temperatures to reach the faucets during winter operation but it also increases the capacity and efficiency of the equipment. Through proper adjustment of the tempering valve, the hot water stored in the coil will not be emptied too quickly and additional draw-off capacity will result.

9. A secondary air damper that will automatically close during off periods of the boiler should be provided. This, of course, is to prevent circulation of cold air through the

Presented December 10, 1941 before the Metropolitan Gas Heating and Air Conditioning Council.

boiler during off periods and thereby increase the standby loss.

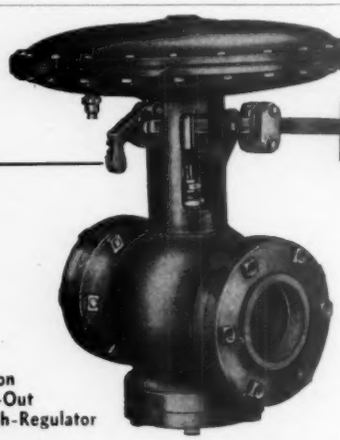
We now have over 300 of these boilers in operation in our territory and approximately 80 contracted for but not delivered. About 50% of those installed are on steam systems and the balance on hot water heating systems. All of these installations have been operating at high efficiencies during both winter and summer. We would like to again point out that the winter operating efficiency in most cases has been so high that they are providing heat and domestic hot water at an operating cost that is nominal for heat alone.

This was determined by calculating the volume of gas that should have been used to maintain standard condition of 70°-60° temperature for the number of degree days for the billing period. (Estimated 5340 average degree days × required radiation × .21 factor = gas consumption).

There has not been one instance where we were unable to deliver sufficient hot water with the instantaneous coil. We consider this remarkable performance, especially in view of the fact that a great many of them are installed in two-family houses. We originally intended to install them in one-family houses only. However, we discovered in certain developments that the customer had rented a basement to another family.

There appears to have been some doubt in the past that instantaneous coils could be used in conjunction with forced circulation hot water heating systems. The reason of course being that the operation of the circulator would bring cold water into the boiler and thereby cause a drop in temperature in domestic hot water supply. This fear is no doubt well founded under certain circumstances, such as when the control hook-up causes the burner and circulator to start simultaneously on the heating cycle, or when undersized boiler or boiler having poor internal water circulation are used.

All of our installations are controlled so that on the house heating cycle, the burner starts first and the circulator does not cut in until boiler water has reached a pre-determined temperature. This temperature of course will depend upon the emission factor used in sizing radiation. We have also discovered that the domestic hot water supply draw-off rate is usually increased while the boiler is on house heating cycle. As far as we are aware this increase in draw-off capacity during house heating cycle applies only to the type and size boiler we are using. A study of the operating efficiencies on boilers having separate meter shows that the average consumption per meter was 6,300 cu. ft. of 540 Btu. gas per month during months of July and August. Assuming the average draw to be 50 gallons per day per customer, we obtained hot water at the rate of 4.2 cu. ft. per gallon. On actual tests in the field we have obtained efficiencies as high as 2.06 cu. ft. per gallon. Some customers claim to have sufficient hot water during the summer from the pilot light alone with the main burners shut off. Another customer, who has a tank coil with 40 gallons storage capacity, claims he only allows the boiler to run on Mondays during the summer and that he has sufficient hot water to last for the whole week. These, of course, are isolated cases and cannot be taken as typical, but they do indicate what can be accomplished with this equipment. The efficiencies obtained will, of course, depend upon the ratio of capacity to actual draw, as this equipment follows the same rule as any other heating equipment, that is, the closer the equipment is used to its full capacity, the greater the efficiency obtained.



Fulton
Cut-Out
Latch-Regulator

It Stops the Flow of Gas If Pressure falls too low

ON a low pressure burner or furnace, the Fulton Cut-Out-Latch Regulator stops the flow of gas if pressure falls below the desired minimum. Whenever that happens, the cut-out latch will operate automatically to bring the valve to its seat and lock it there. Flow will not resume until the operator goes to the valve and opens it by hand. This eliminates completely the hazard for which the regulator is designed. Approved by insurance companies. Write for Bulletin No. 2987.

The CHAPLIN-FULTON MFG. CO.

38 PENN AVENUE PITTSBURGH, PA.

FOR WARM AIR FURNACES AND ROUNDBOILERS

COLUMBIA CONVERSION GAS BURNERS

MODEL P-ZE

Tamper-proof controls, quiet operation, high efficiency, easy installation, positive performance and negligible service requirements—these are the features that have made Columbia NU-TIPE Ductless Gas Burners so popular with scores of Utilities and thousands of home owners all over the country. Performs perfectly with natural, manufactured or mixed gases. *Write for literature.*

COLUMBIA BURNER CO., Dept. A, Toledo, Ohio

CRUSE-KEMPER COMPANY

STEEL PLATE CONSTRUCTION

AMBLER, PA.

GAS HOLDERS

HOLDER INSPECTION

RIVETED OR WELDED FABRICATION & ERECTION

TANKS, BINS, FLUES PURIFIERS, WELDINGS

About Your Gas Service

A message to our 90,000 customers and the public:

The Gas Company, like all other suppliers of essential public services in the daily life of the community and in the national defense, is receiving occasional inquiries about service during war times.

These questions are appropriate and natural. The general public has become newly conscious, within the past two weeks, of all the intricate machinery and plants and organizations of people that have supplied these public services with silent efficiency for so many years. And the fact that these inquiries show so little actual anxiety about any of these services, such as gas and power, transportation and communication, is another evidence of the remarkable coolness with which the people of Portland and vicinity have met all alarms since Sunday morning, December 7.

• • •

No doubt we face a long war, but our cities are already settling down to an efficient and orderly routine of living. The utilities and other public services have been making detailed plans for months to preserve normal service. The Gas Company, for one example, has 750 employees who, with their own defense tasks and their regular jobs well in hand, have energetically joined with civilian defense units of various kinds. It is a veteran organization of engineers, chemists, artisans and workers—ready, trained, experienced and able. In these days, every *expert* is at work—in telephone, telegraph, radio, power, water, gas and all vital services.

• • •

Service maintenance methods used in England under the severest war-time conditions have been thoroughly studied by American gas companies. Gas service in London and other British cities successfully came through the most intensive bombing raids in history.

One interesting but little-known fact is that gas holders (or "tanks" or "reservoirs") are explosion-proof and fire-proof by nature. An incendiary bomb dropping into a gas holder is instantly smothered for lack of oxygen. No gas holder in England has ever caused damage to surrounding citizens or property when bombed. Experience has shown that it is not worth while to bomb gas holders with either incendiary or explosive bombs.

• • •

Our gas manufacturing plant, which is strongly guarded like all utility and similar property, can be blacked out on 60 seconds' notice.

Gas mains and pipes are, of course, safely buried underground everywhere. The only complete interruption of gas service in the history of the Portland Gas & Coke Company happened 47 years ago, at the time of the great 1894 flood when the old gas works at the foot of Flanders Street was flooded.

• • •

Finally, let me explain an important feature of your gas supply system. Portland gas is manufactured from oil. After the gas-making process is finished, large quantities of residues are left, rich in chemicals and substances from which important industrial and defense by-products are manufactured.

During normal times our customers have benefited from the sale of these by-products because we used the revenue from our chemical manufacturing operations to reduce the rates for gas service to our customers. Portland gas rates thus became the lowest of any city in the country not supplied with natural gas.

But now the manufacture of many of these by-products assumes new and greater significance because they have become essential to defense industries. *Thus meeting the industrial demands of war as well as the daily needs of 90,000 gas users makes it doubly important now to keep our plant steadily in production 24 hours a day*

• • •

Every member of our organization knows and accepts his increased responsibilities, and on behalf of all of us I wish to assure you that this big and loyal force is fully prepared to meet them.

Portland Gas & Coke Company

Paul B. McKee.

President

THE ABOVE ADVERTISEMENT WAS RUN IN NEWSPAPERS DURING THE LATTER PART OF DECEMBER IN THE TERRITORY SERVED BY THE PORTLAND (Oregon) GAS & COKE COMPANY IN OREGON AND WASHINGTON.

GREATER CAPACITY,

GREATER ACTIVITY...

LESS OXIDE

REMOVES MORE H_2S!

• Lavino Activated Oxide is supplied in unmixed form... ready for mixing with your own carrier... and is adaptable readily to the needs of your plant, whatever its size or requirements.

Not merely a "satisfactory" purifying medium by virtue of incidental properties, Lavino Activated Oxide is a material made specifically for maximum H_2S removal. As such, its practical capacity and activity are *controlled* factors. And, it offers maximum activity for trace removal and maximum shock resistance. Contains 70% Fe_2O_3 as received; approximately 10% moisture.

Lavino Activated Sponge is available also for the same fine service that distinguishes the Activated Oxide. It is furnished ready-mixed, carefully coated on large, tough, specially selected hardwood shavings.

Both are made in the United States. . . . Both are disinfected by a special Lavino process to minimize the formation of mold, or other fungus growth.

LAVINO "ACTIVATED" OXIDES

LAVINO
ACTIVATED OXIDE

E. J. LAVINO AND COMPANY
1528 WALNUT ST., PHILADELPHIA, PA.

Air Raid Precautions for Gas Undertakings

By

Roy J. Bennie, M.C.E., M. Mech. E.

THIS PAPER surveys Air Raid precautions for the whole Gas Undertaking to cope with conditions similar to those experienced in England. The cost of putting every one into effect would no doubt be very great, and it must be left to the judgment of the individual Undertaking, guided by the Government, to decide which measures are most pressing and how much should be done at any stage of the war.

Short Notice: It has been emphasized by all authorities that only short notice can be given of an aerial attack. Even though the Pacific Ocean and Southern Ocean may be policed by friendly navies, a squadron having an aircraft carrier may slip in near the coast and make a surprise raid. In London, the minimum warning may be ten minutes. In Melbourne, it is desirable to assume a probable maximum of 20 minutes warning; for the modern bomber travels at 240 to 300 miles per hour; and 20 minutes would only correspond with their being first observed eighty miles away. From this 20 minutes must be substracted the unavoidable time in transmission of warnings to local signal stations around the city. It would be well to allow at least five and if possible 10 minutes for this, leaving a maximum time of only 10 to 15 minutes for making all necessary dispositions at the works and out-stations, and for seeking shelter. Coastal cities may have shorter notice than this.

Nature of the Attack: Here again the position is ill defined. So long as there is a friendly navy in the Pacific, it is improbable that the enemy would take and temporarily hold a nearby island to use for an aerodrome and then fortify it and put together heavy bombers, although if the friendly navy were embarrassed elsewhere the establishment of an island depot might then be made temporarily. In this case we might expect bombs of one ton size. But we may assume that such aircraft as would be likely to come against us may carry up to 1000 lbs. of bombs—one of 1000 lbs. two 500 lb. or several smaller units. These bombs may be of three different classes: (a) high explosive, (b) incendiary, (c) noxious gas. Also, the use for which they are intended will affect the ratio of charge to weight.

The high explosive bomb may be designed for extreme penetration with a delay action fuse so as to pierce deeply before bursting. This course would be resorted to because experiments show that the effect of a high explosive bomb bursting in open air is very localised. The Engineering Precautions (Air Raids) Committee of the Institute of Civil Engineers states that with a 500 lb. bomb the expanding gases occupy a sphere of 25 feet radius, and a 3000 lb. bomb (1 ton charge) would occupy 65 feet radius. But if a high explosive bomb penetrates a building or even the roadway and then explodes, it hurls the fragments of road or building as missiles, and the damage is caused mostly by these. An accident at Porthcawl, where 530 lbs. of blasting gelatine exploded on a truck, caused a crater only 3 feet deep and 15 feet broad and 20 feet long; but men at 45 feet and at 63 feet away were not seriously injured by the blast. A 500 lb. bomb would seldom carry a charge exceeding 300 lb. weight. If this struck the open ground at the works it would make a crater 30 feet across and hurl the pitchers about.

Penetration Power of the Bomb: This would occur if the bomb penetrated 5 feet into the ground. Now what is the penetrating power of the bomb? The terminal velocity is usually between 600 and 700 feet per second and the practical upper limit is 1,200 when dropped from very high altitudes. Even at 400 f.p.s. velocity a 500 lb. bomb with a charge /weight ratio 40 per cent would penetrate 20 feet in sand or gravel, but only 2 feet 6 inches into concrete. Of course the subsequent explosion would make further penetration and cause damage below this point. But the deeper the initial penetration the steeper will be the angle of the cone of the crater, and the more confined the sides of the crater. There is not sufficient information available on this question. But the bomb operator is able to adjust the timing of the explosion so as to secure explosion at any desired moment and therefore after any desired penetration. If it fell in a gasholder tank it would shoot a quantity of the water out as well as wrecking the holder bell.

The incendiary bomb contains a thermite mixture which cannot be quenched by water. It is customary to throw dry sand on the molten mass and then pick it up on a shovel and quickly throw it out of the building. An incendiary bomb could ignite a coal heap; but this is not a serious matter, for the total heat in the materials of the bomb is far less than that in the same mass of coal; if the fire is not allowed to get too much hold it can be quenched by water as soon as the thermite reaction has ceased. Additional hydrant capacity and a fire pumping system are called for.

The gas and noxious liquid bomb is more serious and requires equipment of respirators, gas masks, a decontamination apparatus with a specially trained staff, and, of course, gas proof air raid shelter.

Penetration: The distance through which the bomb will penetrate depends upon the velocity with which it falls; and this is greater with the height of drop, but depends on the class of bomb. For example, a small incendiary bomb dropping from 10,000 feet would arrive with a velocity of about 400 feet per second, while a 500 lb. medium case bomb would arrive at 750 feet per second. On the other hand the velocity of the latter dropping from 1000 feet would be less than 240 f.p.s.

Accuracy of Shots: Apparently this is very poor except when a machine is moving slowly at low elevation over its target. For this reason it is expedient to force the machines to remain at high elevations and to keep them moving at high speed. This is the intention of the balloon barrage and anti-aircraft guns. Most anti-aircraft guns cannot prevent aircraft from coming over and dropping bombs; but they can lessen the accuracy of their shots.

Nature of the Explosion: Two

Paper presented before the 1941 Meeting of the Southern Section of the Australian Gas Institute.

phenomena occur—(a) Around the bomb is a sphere of expanding gas which produces its effects by the pressure exerted against obstacles and by the very high temperatures generated by the extreme pressures, and (b) the outer zone of "blast." Blast is really an air wave; no translation of air takes place, only sufficient movement occurs to transmit outwards a pressure wave which is immediately followed by a suction wave, and then by minor oscillations until the wave is finally damped out.

Experiments by Other Nations: Now, experiments in Germany, using a 1000 kilogram charge (= 1 ton), showed that the inner sphere of explosive gases would be 65 feet radius, but that at 500 metres away (1,640 feet) the maximum pressure during the pressure portion of the wave which lasted 0.55 second was 31.6 lbs. per sq. foot and the mean suction was 11.5 lbs. per sq. foot and lasted 0.95 second. It was also shown that the pressure of this wave varies inversely as the distance, and that the period of the oscillation is very roughly proportional to the weight of charge; also, the pressure varies as the charge. This sudden pressure followed by sudden suction causes neighboring diaphragms such as walls to vibrate, and if their period of vibration is anywhere near equal to that of the wave, the initial push followed by the suction may cause failure of the diaphragm, and it is noted that such walls always fall outwards.

The natural frequency of oscillation of buildings (212 tested) of heights varying from 25 to 409 feet was found to vary between ten and one period per second, while the British Building Research Station found the natural period of brick wall panels varying from 4½ to 13½ inches thick to lie between 21 and 45 vibrations per second, and the usual sizes of glass panes had periods of about 60 to 70 per second.

In Barcelona and Madrid this was frequently illustrated where the screen walls of steel and concrete buildings were ripped off and fell outwards when a bomb exploded sufficiently near to give the requisite intensity of air blast wave, but sufficiently remote not to exert direct explosive pressure. It was also shown in these cities that old brick buildings suffered destruction by the same means, the outer wall was pulled out and often was followed by the collapse of the internal timber or cast iron columns. Modern concrete cased steel frame buildings and reinforced concrete buildings were shown to be far less liable to the effects of blast. Of course the windows always burst outwards, and sometimes some of the lighter furnishings went out through the window, but the walls remained intact under conditions far more severe than the brick walls could withstand.

Summary of Data: The above are substantially the data that I have been able to collect. Summarizing,

(a) We may expect accurately aimed bombs if no anti-aircraft guns are available.

(b) But, if enemy aircraft are constrained to fly high by fear of guns of chasers, we may expect chance hits within the works.

(c) The weight of the bomb may be upwards of 1000 lb. gross (500 lbs. of explosive) but more probably the largest would be 500 lbs. containing not more than a 300 lbs. charge.

(d) Warnings of only 10 to 20 minutes can be expected.

(e) There is no way of protecting our plant from a direct hit, for the penetrating power is too great. A first class air shelter comprises a top layer of concrete 4 feet thick followed by 20 feet of earth and a second 4 feet thick layer of concrete.

(f) We can only endeavor to protect our plant and ourselves from the effects of splinters and missiles thrown out of the crater, and from the shock effects of blasts, and from incendiary bombs.

(g) We must provide air raid shelters sufficiently strong to protect our men from splinters and fragments hurled about; from the shock of the blast, and from noxious gases.

The recommendations to follow are based upon the above data.

Protection of the Works

Destruction from direct hits cannot be prevented; but vital spots should be protected as far as possible from missiles thrown about the neighboring explosions. It must be remembered that most of the damage would be caused by pitchers and fragments of concrete hurled out of craters; the majority of the protective measures outlined here aim at reducing damage from this cause.

Boilers: The boiler house should have the openings screened by sandbag walls at least 2 feet thick, placed as near to the building as is consistent with delivery of fuel. If tar is being burned, the boiler room may be completely closed in, and the air may be drawn in through the roof.

The Power House, Exhauster, and Booster Rooms are the most vital spots in the works; for, all essential operations are dependent upon these. Therefore, it is worth while to take special precautions to safeguard them. Windows should all be built up and made as strong as the walls. Daylight may enter through skylights if the latter are provided with opaque blinds or shutters suitable for a blackout. The doors should be protected by sand bag walls as close thereto as is consistent with traffic. The roof structure generally will not be strong enough to permit heavy reinforcement to prevent flying fragments from coming through. Therefore, it is well to protect individual machines with strong frames supporting scrap steel plate, or hardwood and sand bags. If a fragment coming through the roof should strike any high-speed machine such as an electric generator or turboblower, the machine may fly to pieces and damage adjacent machines in the plane of its rotation; so these machines should be protected from each other by intervening walls of sand bags.

If a gas or steam pipe should be fractured by a pitcher coming through the roof, the only thing to do is to valve off the leak as quickly as possible. Therefore, the steam main should have a quick closing valve near the boilers. A break on a gas main is in some respects more serious; for, the gas may flow both ways to the break; also, very probably the gas would ignite. A prolonged fire inside the power house would be a serious matter; therefore means should be provided for rapidly sealing off all gas pipes before they enter the building from the outside. This can easily be achieved either by installing a quick dropping gate valve outside the building, or else by interpolating a "U" bend in the mains outside with connection to a nearby overhead cistern through a large pipe, so that the gas main can be instantly sealed off. A 40-inch seal is all that is required anywhere except perhaps at a booster outlet, which later would require a quick dropping gate valve. These seals could easily be arranged to operate from a local shelter if deemed advisable.

A direct hit from a gas bomb would pierce the roof and would render the place noxious possibly for some hours after the doors had been opened. No other damage would be caused by it unless it fell on and broke some item of plant. An incendiary bomb would cause no harm; for, there is nothing to burn. Dry sand would be thrown on the bomb which would be left to fuse its way through the concrete floor. Otherwise, the thermite bomb can be quickly picked up on a shovel and carried out on a barrow of dry sand.

A direct hit by a high explosive bomb on the power house would be "just too bad;" but, apart from this the above precautions can greatly reduce damage.

On receipt of an air raid warning, all men in the works would have to take cover in air raid shelters, which I have shown cannot be made proof against direct hits. Therefore it is well to disperse men of the same trade so that if one shelter is destroyed all the men of a given trade would not be lost at one blow.

Now, it is quite possible to operate the power house and let the exhausters operate during a raid with only occasional attendance. The engine drivers and firemen should have shelters as near as is safe to the power house; and, distant water level indicators and distant pressure gauges could be fitted in their shelters; or else automatic feed water regulators could be fitted to the boilers.

Dampers should be lowered on boilers and the fires should be banked during a raid because of the uncertain duration of the absence of the attendants. The risk does not lie in the pressure building up during their absence, but in the drop or undue use of water level in the boiler. In the former case the dry tubes or drum might suffer from direct fire action, and in the latter case the boiler might prime over and burst off the cylinder heads of the steam engines. This would be prevented by the operation of an automatic feed water regulator. If the foul main should be pierced or fractured, the exhauster will draw air into the gas system: a careful watch must be kept on the exhauster suction gauge in the shelter during a raid, and if a sudden change occurs it will be necessary to stop the exhausters. The same precaution would be necessary regarding boosters; but it is essential that boosters should be stopped during raids, lest a fractured high pressure main in the street should cause serious harm to neighboring buildings.

Finally, if the walls of the power house are not heavily built, they should be sandbagged outside to a height and less than eight feet above floor level, and higher than any machinery within.

Retort Houses: It is difficult to estimate what extent of damage would follow a direct hit from a demolition bomb on a retort house. If the bomb were short timed, and explosion would occur in the bunkers above the setting: there would be a local wreck of the structure and the top of the settings near the explosion. The foul main and sections of the hydraulic main might be ruptured and air might be drawn in by the exhausters. The gas leaving the damaged retort would ignite, and the flame would ignite the coal in the bunkers above. Part of the coal conveyor would be damaged. The coal and fragments of steel would be hurled about; the latter might pierce neighboring bunkers. The roofing, and possibly portion of the retort house walls, might be blown out.

If the bomb should pierce the brick work of the setting before explosion a large section of the setting will be thrown about and will cause considerable damage to surrounding plant. The hot bricks will also ignite the surface of any coal on to which they might fall. There is no method of preventing these injuries, but damage may be reduced by having adequate fire fighting mains and equipment. All windows should be screened at night, and steps taken to prevent light from the retort house from being seen from the sky during charging and quenching. Any waste heat boilers should be bagged wherever exposed.

If the exhausters should be damaged the gas will all escape in the retort house and may ignite and damage the bunker and roof. This may be prevented if the foul main is provided with a safety outlet valve outside the house, which valve can be opened to atmosphere if necessary.

Coal Stores: A demolition bomb landing near the conveyors, gantries or cranes might wreck them and hurl the coal about and probably ignite it. Apart from damage to the coal handling plant, no other serious damage would occur provided there are ample supplies of water to put out the fires. It might be well to protect the crane cabins and other driving machinery with ¼ inch steel, which will keep off most of the smaller missiles. Where possible, to disperse the coal among several small stores is better than to keep it all in one large store.

Condensers and washers are liable to be hit by missiles. The low lying washers could be sandbagged; but most of this class of plant is too high.

Purifiers: The chance of these being hit is relatively great because of their large ground area. A direct hit would wreck at least one box and hurl up the oxide and fragments of cast iron. Gas connections would be broken and ignition would ensue. The oxide itself if sufficiently "spent" would ignite and pollute the air on a still day with stifling sulphur dioxide. The only remedy is the fire hose.

Tar and Liquor Well: A small bomb falling into the well would scatter the tar and liquor over surrounding buildings. The tar might be ignited from neighboring fires. A plentiful supply of wet sand should be available to smother the tar burning on level surfaces. The ammonia evaporating from the liquor thrown about by the bomb might constitute a minor noxious gas nuisance. The stocks of tar and liquor should be kept as low as possible, especially if the tanks are near vital places. The same precaution is necessary for safeguarding gas oil storages. Foam equipment should be installed.

Salthouse: Boilers and steam pipes require the same safeguards, as mentioned above, and the elevated acid and liquor tanks should carry stocks as small as possible, so as to reduce the trouble from them splashing about. All tanks should be sandbagged. The main acid tank should be specially bagged around, planked over and bagged on top. If there is a liquor concentrating plant, the stock of concentrated liquor must be kept as low as possible. The salthouse stills may continue to operate during a raid—perhaps at a reduced rate.

Gas Mains: Overhead gas mains are extremely liable to damage from flying scraps; and the only precautions that can be adopted regarding these, and the condensers, washers and purifiers is to install quick-closing valves, emergency seals, or gas bag holes such as those used in Birmingham. (*Vide* Gas Journal 16/11/38 p. 560). These should be installed a way from the plant concerned so that the site would not be too hot to operate them. I do not consider gas bags as satisfactory as valves or water seals; for, the leakage past them, when used in dirty gas works mains, might be sufficient to keep a large flame burning. When a gas main or other part of the plant is fractured, the nearest valve or seal should be operated without hesitation. An open gas main burning at the mouth will not be liable to internal explosion if the gas supply is suddenly cut off a hundred feet away; for the gas will burn back into the pipe until finally smothered by the carbon dioxide formed by its combustion. Therefore, the sudden sealing of a fractured pipe at a point remote from the fracture will be quite a safe procedure.

Gas Holders at the Works should carry minimum stocks of gas. There is no risk of explosion, but a strong wind might blow the flames from a wrecked holder around the surrounding plant or damage the neighborhood. A large bomb falling within the tank might broach it if above ground, and there would be a gush of water that might submerge

temporarily some of the plant. But the direction of the wave can be deflected by sand bag dams and appropriate channels dug to lead away the water. The power house should be specially protected from this wave which should be prevented from entering the building.

Office Buildings and Laboratories: We can only paste cloth to the windows; windows and doors may be pulled out by the blast suction; and buildings may be damaged by flying debris. Any important records should be safeguarded by duplicates preserved in another place. Block up all the unwanted openings.

Electric Power Supply: Duplicate sources of electrical power are desirable. The lights should be grouped on separate lighting circuits, so that the works can be blacked out instantly without interfering with normal operation. Special dim air raid lamps can be lit from power circuits so as not to be affected by the cut off of the normal lighting circuit.

Fire Fighting: Additional fire fighting mains with gas or oil driven pumps may be installed to draw water from a near-by stream or from a gas holder tank. This is important, for if the city has been bombed, the water mains supplying the gas works may have been fractured or the water may be all required for putting out the city fires. Local fire brigade officers should be consulted on this question and on the organization and training of fire-fighting squads to be capable of operating independently when the fire brigade is fully occupied elsewhere.

Spares: In view of the rapid wastage, it is important to preserve larger stocks of spares and materials for emergency repairs and patching. Overhead mains are extremely liable to damage and it would be useful to have spare lengths of the chief sizes available. Sound materials from wrecked plant should be salvaged as soon as possible for use for emergency repairs. In larger works, the duplication of more important mains, along different routes, might be advisable. Spares should be stored in small dumps dispersed around the works, or else stored right away from the works. Pieces of plate bent to fit the outside of the pipe, with clips and clay or Scotch cement, should be kept to patch smaller holes in mains.

Shelters: Where the ground water level is not too near the surface, the shelters should be excavated so that at least the haunches of the roof arches are at ground level. If the shelters are made with strong doors it is possible to reduce blast shock on the inmates. But whether the shelter is above or below ground the doors should be sheltered by bags or earth-works for protection against missiles. Shelters should be reinforced concrete rectangular passages, and packed on the outside with at least 2 feet of sand bags where exposed, and ventilated by air mechanically drawn in from a high vent and exhausted along a zig-zag passage. Where gas attack is feared, the entrance should have two airtight doors forming an air lock. The outer door should be very strong and should open inwards so that egress can be made over any obstacles that might fall in front of it. The shelter should be well lit electrically and be equipped with kerosene lamps which should be lit and turned low as soon as the shelter is entered. The shelter should contain seats, and a locker containing gas masks.

Long shelters are made zig-zag to lessen damage from a direct hit of a shell or small bomb. Never more than 50 men should be in one shelter; on the contrary, the personnel should be spread among many small shelters disposed all over the premises, but always away from walls or structures that might fall on them. Temporary sanitary conveniences should be placed in at least the larger shelters. The interstices between the bags should be filled in with sand to prevent blast shock. If oxide is available its use instead of sand in bags would be preferable around shelters on account of its greater density. Larger shelters should be telephonically connected together and to an observing post by telephone cable buried in barrel pipe.

In small Gas Works spread over a large area, unless it is anticipated that raids of long duration must be encountered, simple trenches 3 feet deep with the earth piled on top of scrap laid across, will furnish adequate shelters, the occupants lying down on boards.

Sabotage and Theft: It is probable that even when a raid is not in operation, it may become necessary to reduce lights at night time, in which case liability to theft and sabotage may be increased. To counter this, the gates should be kept shut all night, and the boundaries well barbed and patrolled.

Decontamination Squads: Men should be selected for physical strength and trained in methods of detecting gas and poisonous liquids, and in methods of decontamination.

Ambulance and First Aid: It is well to have plenty of men trained to handle the class of injury likely to occur.

Camouflage: Little can be done to disguise vital spots. Steam exhausting from the power house might well be conveyed to any disused retort house and exhausted through the roof. Gas holders cannot be effectively concealed by day, but the crowns should not reflect light at night. For this reason there are best painted a matte grey, and it would be well to disguise their circularity by painting a large rectangle on the crown and coloring the surroundings to match the ground. Shelters should be camouflaged with coal or coke heaps. Australian atmospheres are so clear compared with European that little can be done for disguise.

Sandbags: Special tarred paper bags are now obtainable for use as sand bags. They are weather resisting and have a reasonable life.

Gasholder Outstations

At least two men should be present in the valve room unless there are patrols on the site. Whereas during the former war the holder was flood lit to prevent sabotage, now it is necessary to provide for possible blackouts, when the saboteur might creep in. Barbed or electric fences and special patrols are here called for, combined with the "electric eye." All valve room windows should be blocked up or else protected by high sandbag walls, and the doors require the same safeguard. The room requires dark blinds to permit it to be well lit at night time. Duplicate electric power supply to boosters is advisable. All trunk mains leaving valve rooms should be fitted with quick-acting valves or seals placed at least 50 feet from the buildings, so that if the valve room trunk is fractured, the mains will not feed gas back to the fracture. The roof of a valve room is a weak point; for, should a bomb burst in the holder tank it might cause the water to thump on to the nearby valve roof, and the ensuing wreckage might damage the governors. The valve room and surroundings must be protected from the flood that would follow the bursting of the steel water tanks of gas holders having steel tanks above ground.

Distribution Mains

Nature of Damage: If a bomb drops in the street and blows a crater, the size of this depends upon the size of the bomb and the strength of the road; but generally the crater would be not less than one-third of the width of the street, larger in macadam and possibly smaller in concrete. The depth would be probably

at least 5 feet; my notes on Penetration show what is possible. In these circumstances, cables, water and gas pipes are all liable to disruption. Those pipes immediately in the crater will certainly be broken, but there may also be fissures and tectonic movements that may fracture mains unexposed. The latter are dangerous in that they may cause unknown leakage into neighboring buildings and liability to explosion. Consequently it will be necessary to examine from time to time buildings in the neighborhood of craters where the gas main was not exposed, to ascertain whether any gas has escaped; and it would be expedient to probe the ground along the line of the main, with a leakage indicator.

Fractured Mains: Regarding fractured mains lying in the crater, two pictures present themselves to my mind: in the first, a crater has been opened, a section of the main broken out and earth and stones flying about, some possibly falling back into the crater and partly burying the pipe: the escaping gas may or may not ignite; but ignition is very probable. The windows of neighboring buildings will be broken, and possibly some walls may be pulled out and lie on top of the crater.

Water in Mains: In the second picture, all the above things are seen to happen, but there is a water main in the crater, and this is fractured too. The water quickly fills the crater, and may or may not start scouring the crater clear of debris; but certainly the water would enter the gas pipe and seal off the gas. If the gas main is on a slope the water will flow down it, and may drive the gas ahead of it until it is able to form a siphon, and then the influx of water will be greatly accelerated. If the fractured water main is close to the fractured gas main and the crater is covered with debris from a neighboring building, the water may be capable of developing quite a high pressure in the gas main, which would itself in effect become a water main for the time. In any case water entering on the high ground would produce high pressures in the pipes in the neighboring low ground if the flow is obstructed. But the pressures imposed would never exceed the strength of the pipes which are quite capable of acting as water mains.

Now, how are we going to counter these misfortunes?

Stopping Escapes: If the crater is clean so that the gas pipes can be approached, it would be possible to insert by a spear bar one of those conical stoppers described in THE GAS JOURNAL 9/11/38. p. 451. A stock of these of different sizes should be carried on every emergency repair wagon. The end of the pipe would be stoppered, and the men would probably be able then to approach the main and plug any small leaks temporarily with clay. But, if this procedure cannot be followed, other measures must be adopted.

If gas mains, like water mains, were equipped with valves at frequent intervals, the valves could be quickly operated, and the gas outflow or the influx of water stopped; but there are no such valves. The special bagging connection used in Birmingham (*vide* GAS JOURNAL 16/11/38, p. 560.) would seal off most of the gas if one could be operated on each side of the break. But this bag would not resist the water influx if a high head of water was operating, although these bags are inflated by an air compressor and can exert a considerable resistance to movement. A very good substitute for a valve is a device used recently by Mr. H. E. Grove: the top of the main is slotted half way around and a flanged extension is carried up. When it is desired to block the main a diaphragm is pushed in with a piece of square packing stretched around its periphery. Tests on these showed them to be quite tight. These are cheaper than valves and would fulfill the requirements of emergency measures. A number should be installed in vital positions on important mains, such as on the approaches to bridges, and on all trunk mains near valve rooms.

In England some engineers have installed "U" bends in the pipes so as to form seal pots and these have been connected through stop taps to nearby water mains; for instant use. These are, of course, perfect gas seals, but do not in my opinion answer the problem of stopping the flow of water along the main. Mr. Grove's diaphragm would do so, provided the bottom of the pipe was kept clear of scale and dust deposits at this point. The device would probably take the form of a casting inserted between lengths of the main, and covered by a rectangular road cover. The emergency repair wagons could carry a stock of assorted sizes of diaphragms.

Combating Leakage of a Broken Main: The low pressure reticulation is usually a complete network where all cross streets are linked up with through streets. Consequently, there is no possibility of introducing valves or any substitute for valves in the low pressure system; for every street corner would require four valves. So we still have to devise a method for stopping leakage of a broken main by some method quicker than breaking a large hole in the road, piercing the main and putting in a "slide" or a gas bag. Time is the essence of the contract. A new method has occurred to me, and I think that we should experiment with it on various sizes of main. A "jack-hammer" compressed-air rock drill can pierce concrete at a rate of 6 to 12 inches per minute, and a small hole can be opened down to the main in two or three minutes if its position is accurately known. If it is only approximately known it can soon be located by the same drill or by an electric pipe locator. Then, with an appropriate cutter and power driven gear a hole in the top of the main can be refined or drilled in five to ten minutes. It will then be an easy matter to plug the main in a few seconds by injecting still clay or mortar from a special syringe until it piles up and forms a plug.

This will stop the gas flow and perhaps prevent fires and explosions, but the stoppage itself will then have to be cleared, which might involve subsequent road openings. I think it would be possible to insert a rubber bag into the smaller mains through the hole and would like to see it tried. After the main had been repaired at the crater, the bag could be deflated and withdrawn, and the hole could be plugged by a stopper and putty, or even by a common screwed taper plug. This procedure after a bit of experiment should suffice to block any main provided there was not a rapid flow of water in it.

A Reference Book: On each emergency wagon should be kept a book containing full information of the sizes of mains in all streets and their positions in the streets; and the gangs should also know how much material should be injected into each size of main to plug it. This method would save much money in peace time also, for every time a branch is connected to a main two extra excavations have to be made to put in slides. It might be possible to use some other material than clay or mortar, such as a plasticized pitch, that could be removed chemically or by inserting an electric heating element. Even a weak mixture of clay and sand could be dispersed by a hose and the water could be removed at the nearest syphon.

Now, having our mains full of water we must pump them out as speedily as possible. We should therefore at all lowest points insert in the existing syphon pots upstand

pipes of 2 inch size, we may still retain our small syphon upstands for ordinary use. Through a 2 inch pipe, 250 gallons could be removed every minute without cavitation in the pump. We should provide emergency centrifugal pumps, engine driven, to drain out the mains. These could be similar to those continually used by the P.M.G.'s. Department for pumping out their cable manholes. It would also be practicable to pump out mains through holes pierced in them from the road surface in the manner suggested above. Another method for plugging an open main in a crater would be by flinging balls of soft clay at it, thus building up a mound of clay. It is worth while designing a mud slinger similar to the sand slinger used in a foundry moulding shop.

Pressure Control: The technical press from time to time mentions that it is expedient to reduce pressures during air raids so as to lessen risk of fires, or gassing of people near broken mains or service pipes. In any case the leakage of gas from a large broken main would automatically reduce pressures over a considerable area. In these circumstances many pilots will blow out, and if those appliances not fitted with Klixon safety cut-outs are not turned off during a raid, the gas will escape into the room whenever the thermostat opens the gas valve. The only way to counter this is to keep warning the consumers through the press and wireless. There is no remedy at all; for even if the pressures were not reduced, the blast from a high explosive bomb would put out all the pilots for half-a-mile around. Pressures must be rapidly raised directly after raids, and the public must be warned to expect such rapid fluctuations.

But referring to this question of reducing pressures, I do not think it expedient to make reductions below the normal gas holder pressure at the time. All boosters and fans would be shut down but the remaining governors would be left at normal pressures. In the Melbourne reticulation, the mains carry only low pressures, never greater than holder pressures near consumers' premises. I think that references in the technical press to reduction of pressures during air raids have in mind reticulations that are either high pressure systems, or else low pressure systems fed by high pressure feeders, and it is the fear of the latter bursting that has induced the suggestion to reduce the pressures. It must be remembered that many industries supplying war needs are depending on regular gas supply and we should not needlessly interrupt them.

Sabotage of Mains: Wherever mains are exposed—particularly in deserted localities—they are liable to sabotage. These mains are chiefly on bridges which may require patrolling. Where a pipe is bracketed from a bridge passing over an electric railway or tramway track, it should be insulated from the bridge, and it should have insulated joints near each end of the bridge, so that no damage would ensue if the pipe should be shorted to the electric trolley wire.

Emergency Repair Equipment: Additional facilities should be provided for the rapid assembly of repair gangs and materials and their transport to the site of damage. The Industry must regard the Gas Works and city streets as its own battlefield. The emergency trucks should be fitted out with special equipment of air compressors, jack-hammers, drills, pipe plugging devices and repair materials, and besides ordinary mains and services repair equipment, an assortment of patches, gas bags, clay, conical stoppers, etc., should be carried. Emergency equipment should be stored in two separate places lest one of them should be bombed.

Conclusion: The foregoing rapid survey of Air Raid Precautions is by nature very conservative; but the only sound way to consider the problem is to bomb the undertaking from the basement to the attic and consider how best to minimize the losses; then weigh the probability of such misfortunes, and upon this decide how much to plan now, how much to do now, and how much may be left until the last moment.

The following additional notes may prove useful. For protection against splinters from bombs up to 500 lbs. exploding not less than 50 feet away, recommended thicknesses of materials are given below:—

Mild Steel	1½	inches
Solid brick in cement mortar	13½	inches
Plain Concrete (1¼ : 12).....	15	inches
Reinforced Concrete (1¼ : 2½ : 5)..	12	inches
Earth or Sand	30	inches
Ballast	24	inches

Timber may be fire-proofed by thorough impregnation with a concentrated solution of sulphate of ammonia. Otherwise, paint with two thick coats of the following mixture: Sodium Silicate 112 lbs., pipe clay, or whitening and colouring matter 150 lbs., water 100 lbs.

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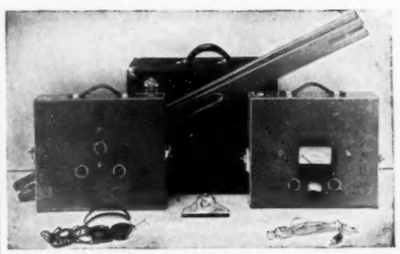

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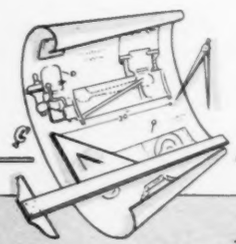

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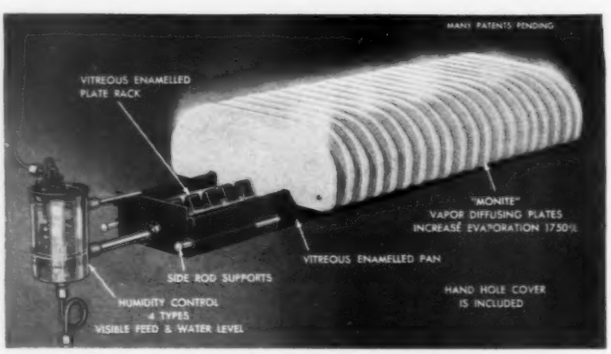
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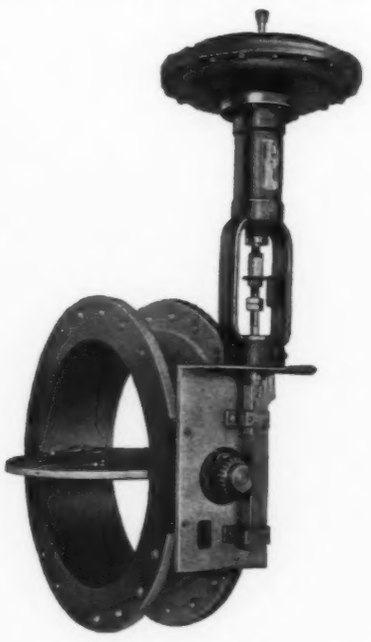
The R-S Products Corporation of Philadelphia has developed the Butterfly Valve so that it is now used in many services to replace more expensive valves of a more conventional type. It is said that these valves close as tightly as double seated valves.

They are adapted to automatic operation under high or low pressure and temperatures, in sizes from 2" to 72". Either or both bodies and vanes are manufactured from any required metal or alloy such as aluminum, brass, bronze, stainless steel, Monel metal



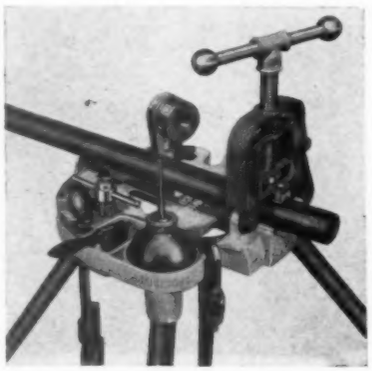
and others. These applications include high and low pressures and temperatures for the accurate flow control of oil, oil vapor, air, gas, steam, water and chemicals, or any material that flows or can be pushed through a pipe.

Extended stuffing boxes and shafts, ball bearings and rotary seals are furnished when required, as well as special linings such as rubber, cadmium plating, etc.

They may be operated automatically by floats, electric motors, solenoids, steam, compressed air, hydraulic or remote control systems.

Heavy-Duty "Vistand"

A new heavy-duty "Vistand" announced by Armstrong Mfg. Co., is designed for either portable or stationary use. As illustrated, it is so well balanced and light in weight



that it can be carried in one hand. It has spreads of 50" in front and 43" from front to rear leg.

The features of the platform, which measures 14" in both width and depth, include tool notches and slots around the rim oilcan recess, and a special "dope" pot. Equipment also includes three benders—one for ¾" pipe, and reverse benders for ½" and ¾" pipe—placed directly over the right front leg to prevent tipping during the bending operation.

Armstrong also announces a new side open pipe vise which may be installed on a bench or for special purposes on the side or rear of a service truck. The unit has broad jaws, frictionless disk, quick-acting screw and handy swinging handle. It takes pipe from ⅛" to 2".

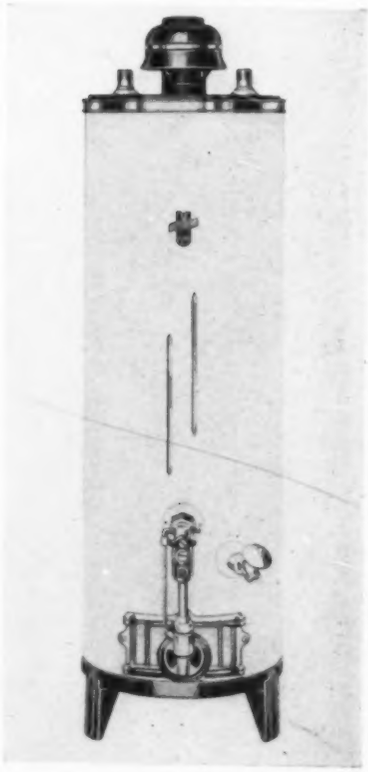
Armstrong hinged vises have been redesigned in three ranges—⅛" to 2"; ⅛" to 2½", and ⅛" to 3½".

Descriptive literature may be obtained from the company's nearest distributor or by writing direct to Armstrong Mfg. Co., Bridgeport, Conn.

Water Heater With Enameled Tank

Model "A" Automatic Storage Water Heater with porcelain enameled tank is announced by Bulletin P.E. 4110 issued by Hotstream Heater Company, 8005 Grand Ave., Cleveland, Ohio.

Substantially built of "Armco" ingot iron, heavily enameled inside and out, the tank has 1½" of insulation completely surrounding the heater.



Hotstream Model "A"

Mechanical features include a special arrangement of burner to insure high efficiency, automatic ball type safety pilot, a new type gas control valve for main burner, snap action thermostat, copper dip tube, draft hood and brass drain cock.

Made in 55 sizes, 15 to 60 gallon capacities for natural or manufactured gas with input ratings of 10,000 to 40,000 Btu. per hour. Guaranteed 20 years. Approved by A.G.A. Laboratory. Bulletin on request.

O.P.M. Priority Rulings

Public Utilities

Public utilities are forbidden to undertake any substantial expansion of property or equipment without express permission from the Office of Production Management by amendments to Preference Rating Order P-46, issued by the Division to Priorities.

The order as amended applies to all producers engaged in supplying electric power, gas, water, public sanitation services, or central steam heating, regardless of whether or not they have applied for priority assistance by executing an acceptance of the order. It applies to publicly owned as well as private utility companies, and will cover Rural Electrification Administration cooperatives.

The amendments announced are in line with the policy recently adopted by the Supply Priorities and Allocations Board of disapproving projects for new or expanded utilities unless they are essential. However, projects already under way and at least 40 per cent complete as of December 5 may be finished if the utility has supplies on hand for the purpose, or is granted priority assistance to obtain them.

With that one exception, utilities may not without permission withdraw materials even from their own storage or inventories for expansion projects costing more than $1500 in the case of underground connections or more than $500 in other cases.

Preference Rating Order P-46 as originally issued on September 17, 1941, permitted specified utilities and their suppliers, after executing an acceptance of the order, to use an A-10 rating to obtain maintenance and repair materials and operating supplies. It contained inventory and other restrictions which were construed not to apply to utilities which did not execute the acceptance or apply for priority assistance. With today's amendments, the order covers all utilities of the types specified, without exception.

Utilities will continue to receive priority assistance when necessary to obtain operating supplies and materials needed for maintenance and repair, with certain restrictions based on use during 1940.

All utilities are required to maintain a continuing inventory of material included in stores accounts.

Amendment No. 3 to Preference Rating Order No. P-46, Dec. 11th.

(a) Section 978.1 as heretofore amended is hereby amended as follows:

1. Paragraph (a) (1) is amended to read as follows:

(1) "Producer" means any individual, partnership, association, corporation, governmental unit or other form of organization engaged in one or more of the following services:

(i) supplying electric power directly or indirectly for general use by the public;

(ii) supplying gas, natural or manufactured, directly or indirectly for general use by the public;

(iii) supplying water directly or indirectly for general use by the public;

(iv) public sanitation services, but not including manufacturers of public sanitation products;

(v) supplying central steam heating directly or indirectly for general use by the public.

The term "Producer" includes any producer as herein defined, whether or not such producer has executed the acceptance attached hereto.

2. Paragraph (f) (3) is hereby amended to read as follows:

(3) (i) No Producer shall, during any Calendar Quarterly Period, make withdrawals from stores or inventory of any items of Materials to be used as Operating Supplies or for Maintenance or Repair or for any other purpose the aggregate dollar volume of which shall exceed the aggregate dollar volume of the withdrawals of such items of Material of the same class during the corresponding quarter of 1940, or, at the Producer's option, 25% of the aggregate dollar volume of the withdrawals of such items of Material of the same class during the calendar year 1940 unless such withdrawals shall be specifically authorized in advance by the Office of Production Management on the Producer's application therefor.

(ii) No Producer shall make withdrawals from stores or inventory of Material to be used for additions to or expansion of property or equipment without securing approval in advance from the Office of Production Management, unless

(*a*) the project or job is under construction and 40% of the total dollar value thereof is installed on December 5, 1941; or

(*b*) the cost or material for the work order, job or project is less than $1500 in the case of underground connections and $500 in the cast of other additions to or expansion of property or equipment; provided, however, that no single work order, job or project shall be subdivided into parts in order to come below these limits, and provided further that in no event shall lines be extended more than 1000 feet from existing facilities.

3. Paragraph (g) is amended to read as follows:

(g) *Audits and Reports.*

1. Each Producer and each Supplier who applies the preference rating hereby assigned, and each person who accepts a purchase order or contract for Material to which the preference rating is applied, shall submit from time to time to an audit and inspection by duly authorized representatives of the Office of Production Management.

2. Each Producer and each such Supplier shall execute and file with the Office of Production Management such reports and questionnaires as said Office shall from time to time request. No such reports shall be filed until such time as the proper forms are prescribed by the Office of Production Management.

3. Each Producer shall maintain a continuing inventory of material included in stores accounts.

(b) This Order shall take effect immediately.

(Signed) D. M. Nelson
Donald M. Nelson
Director of Priorities

Basic Priorities Order Amended

Priorities Regulation No. 1, the basic document which governs the operations of the priority system, has been amended in several important respects effective December 23.

Most important of the changes is a requirement that *all* orders bearing a priority rating, including B-ratings for essential civilian orders as well as A-ratings for defense orders, must be accepted by producers, in preference to any unrated order. Previously the acceptance of B-rated orders was not mandatory.

The required acceptance of B-rated orders is a further transitional step in the move toward allocation of scarce materials, since B ratings are one method of designating the relative importance of civilian uses for materials after war requirements have been met.

Treatment which must be given to defense orders is clarified by a new provision which assigns a priority rating of A-10 to all defense orders not otherwise rated. This change is intended to eliminate any confusion which might arise as to the handling of those defense orders which were previously unrated, in relation to other orders which had been specifically rated A-10, the lowest rating in the A series.

Section 944.14 of Priorities Regulation No. 1 has been revised to provide a stricter limitation of inventories. Whereas producers were previously forbidden to increase their inventories beyond the amount necessary to meet required deliveries of their products, they are now forbidden to accept delivery of materials for inventory in excess of a practicable working minimum. This means that all inventories of any materials whatever must be reduced to a practicable working minimum, strictly construed, before they can be replenished. The prohibition applies to suppliers of materials for inventory as well as to producers who maintain inventories, and it covers non-defense as well as defense producers. An exception is made, however, for inventories of materials imported from foreign countries.

A possible loophole in the inventory restriction is closed by a provision that no material may be fabricated, processed, alloyed or otherwise altered if the producer's inventory of the material in its altered form would thereby be increased beyond a practicable working minimum, unless specific authorization is granted by the Director of Priorities.

Another amendment will help to prevent receipt of a new, high-rated order from interfering with fulfillment of the delivery date on a previously accepted lower-rated order. Unless the new order bears an AA rating or is accompanied by specific direction from the Director of Priorities, it will not have to be accepted if its acceptance would necessitate preempting material which has already been completed to fill a previously accepted defense order which bears a lower rating, or if it would preempt material which is within fifteen days of completion. Or, if the new order is accepted, the producer may not divert material already completed or about to be completed on a previous defense order for use in filling the new order.

Priorities Regulation No. 1 lays down a general framework for priorities compliance, and it may affect all types of industrial and commercial transactions. Copies of the regulation as amended may be obtained from the Priorities Division of OPM in Washington or from field representatives.

Section for Production of Gas Ranges Limited by O.P.M.

Use of iron and steel in the manufacture of a wide variety of stoves, ranges and other domestic cooking appliances will be curtailed sharply beginning January 1 under an order issued by Donald M. Nelson, Director of Priorities.

The order calls for an average cut of 35 percent during the period from January 1 to April 30 below the monthly average of iron and steel used in the 12 months ended June 30, 1941.

Between now and January 1, use of these critical materials will be frozen at the level of average daily use during the 12-month base period.

Curtailment is based on size of firms, so that many smaller manufacturers located in little southern towns where no defense work is obtainable will not be faced with too serious a labor displacement problem. The industry as a whole is not well adapted for conversion to defense work, lacking the equipment for precision work. The industry employs approximately 60,000 workers.

Cooking appliances covered by the order include all types of ranges, stoves, hot plates, combination ranges, camp and trailer stoves, and fuel oil conversion range burners, using gas, electricity, coal and wood, kerosene, fuel oil or gasoline, or any combination of coal and wood or fuel oil with gas or electricity.

Companies are classed according to the factory sales value of products manufactured during the base period. The following table shows the percentage cut for each class during the first quarter of 1942:

Class	Factory Sales Value	% Cut
A	$3,000,000 or more	42
B	$1,000,001 to $3,000,000	36
C	$1,000,000 or less	30

Government purchases of cooking appliances obtained on a competitive bidding basis for defense housing are excluded from the quota, as are lend-lease and certain other defense purchases.

Other important features of the order are:

1. Effective December 15, no manufacturer is permitted to use iron or steel to produce cover tops or lids to cover cooking surfaces of cooking appliances equipped with tops or lids containing these materials.

2. Beginning February 1, no manufacturer can use any bright work, bright finish, metal finish or trim containing copper, nickel, chrome or aluminum in producing the appliances.

3. Inventories of raw material, semi-processed materials or finished parts are restricted to minimum requirements.

4. Manufacturers cannot shift production between different fuel types, except by appeal to the Office of Production Management.

The order, which does not affect institutional and commercial cooking appliances and does not cover repair and replacement parts, was drafted by the Electrical Products and Consumers Durable Goods Branch of the Division of Civilian Supply after meetings with industry representatives and after consultation with interested government agencies.

In a letter accompanying the order, manufacturers were urged to reduce the number of models produced, concentrate on those making the most economical use of iron and steel, and adopt conservation measures such as substitution, redesign and respecification.

New Valve and Meter Offices On West Coast

Because of expanded activities, Pittsburgh Equitable Meter Company and Merco Nordstrom Valve Company have opened new sales offices in San Francisco and Seattle. This is in line with a plan of increased sales and service facilities for the entire west coast, according to Captain A. E. Higgins, Vice President. Russ Waters has been appointed Branch Manager of the new San Francisco office, located in the Hobart Building, 582 Market Street. Mr. Waters will be assisted by Fred D. Webster, Richard L. Ford and Gilbert T. Bowman in covering the area of Northern California and Nevada. The new Seattle office located at 119 West Denny Way, will serve the states of Oregon, Washington and Idaho, under the jurisdiction of the San Francisco branch. Mr. Frank P. Tangney will be in charge of water meter sales in general in that area and Mr. William R. Dominick will cover industrial sales. Hereafter, sales activities in the Bay District will be directed from the San Francisco office.

Priority *in gas purification* earned by a quarter-century of reliable performance, tested economy & cooperative service

GPM
IRON HYDROXIDE

GAS PURIFYING MATERIALS COMPANY INC., L. I. CITY, N. Y.

News of the Gas Industry

Gas Men Active at Southeastern Regional Restaurant Convention and Exposition

Gas Equipment Manufacturers Conduct Joint Exhibit

Gas men were one of the most active groups at the annual Southeastern Regional Restaurant Convention and Exposition, which was held at the Mayflower Hotel, Washington, D. C., December 1, 2 and 3. Gas service and gas equipment was featured by means of a three-gun barrage consisting of a large display of gas food service equipment, an unusual stage demonstration, and talks by representatives of our industry.

Under the joint sponsorship of the Washington Gas Light Company and leading equipment manufacturers, a large space in the main lobby of the Mayflower was equipped with heavy-duty broilers, ranges, deep fat fryers, toasters, grilles and bake ovens, and a gas year-'round air conditioner. With an attractive and colorful background, and with ingenious spotlights, the appliances in this display received continuous attention from the many restaurant, tearoom and other food service operators in attendance at the Convention.

A unique attention-getter was an arrangement somewhat like a telephone booth in the center of the gas display. Presiding over the booth was Miss Mary Nielsen, who asked visitors to speak into a microphone and record their suggestions for bettering gas service and gas appliances. Before the close of the Convention, a prize was given for those suggestions which a jury deemed to be most valuable.

Stage Demonstration Scores

At the Tuesday night session, what was perhaps one of the largest capacity cooking demonstrations ever put on the stage at a restaurant convention, was sponsored by Standard Gas Equipment Corporation and Washington Gas Light Company. A large bake oven, two heavy-duty ranges, a heavy-duty broiler and two large deep fat fryers were in full blast. The demonstration was presided over by Mr. Frank Novak, noted restaurant operator of Cape Cod, Mass. With the assistance of a crew of snappily-uniformed colored cooks, and with pretty Peggy Dugas adding to the scenery, and rendering songs, Mr. Novak supervised the preparation of an elaborate banquet. Quality, appearance and speed were his keynotes. Interest was sustained by means of several stunts. Among them was Mr. Novak's carving of a swan from a cake of ice located close to the ranges and bake oven, thus emphasizing the high efficiency of the insulation. Also, to dramatize the speed of cooking vast quantities of food for service at one time, Mr. Novak rigged up an endless belt across the front of the stage. At breakneck speed the cooked food was placed on serving platters as they roared off the production line.

Dr. William R. Hainsworth Elected President of American Society of Refrigerating Engineers

Dr. William R. Hainsworth, of New York, vice-president of Servel, Inc., in charge of engineering, and national authority in the field of refrigeration research, was elected president of the American Society of Refrigerating Engineers at the annual meeting in St. Louis on December 4th.

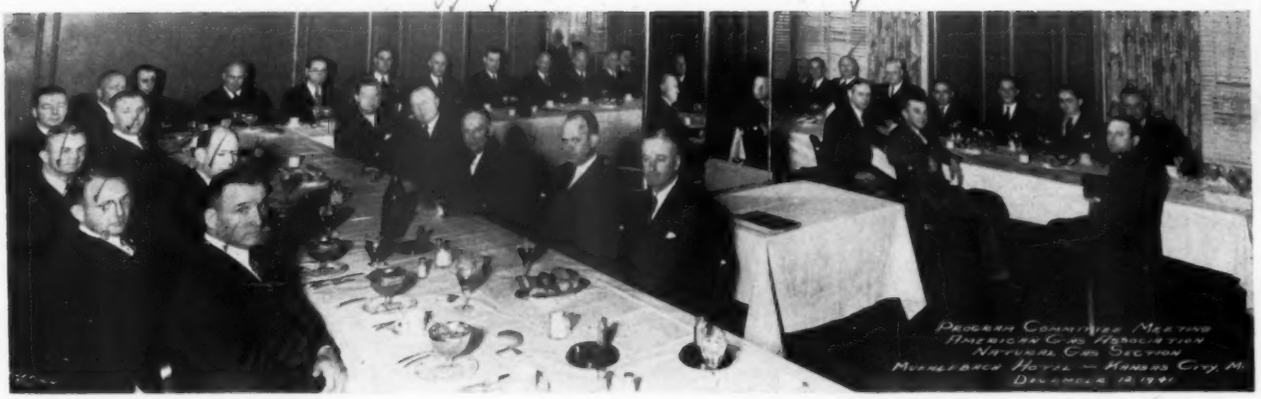
Dr. Hainsworth, who has been engaged in refrigeration research more than twenty years, succeeds L. L. Lewis, vice-president of the Carrier Corporation, Syracuse, N. Y., retiring president of the Society.

In 1933, Dr. Hainsworth was awarded the Charles A. Munroe Award by the American Gas Association for his contributions to the gas industry in the field of scientific research.

Becoming affiliated with Servel in 1929, Dr. Hainsworth undertook the direction of extensive research on air cooling and improvements in domestic and commercial refrigeration. In 1935 he became vice-president of the company in charge of engineering.

FIRST AID AT BROOKLYN UNION

As one phase of its defense preparations The Brooklyn Union Gas Company is training its employees in First Aid. Shown here are a group of girls learning the use of prone pressure resuscitation and a First Aid class being instructed in the use of splints. Charles Barkus, of the New York City Fire Department, is the instructor.



Luncheon meeting of Program Committee, Natural Gas Section, American Gas Association, Hotel Muehlebach, Kansas City, Mo.; Clyde C. Phillips, Columbus, Ohio; Robert W. Ductable from left to right are: J. I. Cormany, Kansas City, Mo.; Melvin V. Harlin, Bartlesville, Okla.; John L. Gere, Bartlesville, Okla.; J. G. Dickinson, Amarillo, Texas; C. H. Koinm, Kansas City, Missouri, December 12, 1941. On the outside of the New Orleans, La.; H. L. Gaidry, New Orleans, La.; J. H. Warden, Tulsa, Okla.; E. L. Rawlins, Shreveport, La.; Robert W. Hendee, Colorado Springs, Colo.; B. R. Bay, Omaha, Nebr.; E. H. Poe, New York, N. Y.; E. W. Borger, Pittsburgh, Pa.; H. J. Larson, Omaha, Nebr.; Julian L. Foster, Dallas, Texas; E. C. Joullian, Oklahoma City, Okla.; Lee Woodward, Alva, Okla.; Lyman H. Bell, Kansas City, Mo.; J. C. Reinbold, Kansas City, Mo.; F. M. Rosenkrans, Kansas City, Mo.; J. R. Guidroz, ker, Tulsa, Okla.; Ray T. Ratliff, Kansas City, Mo.; J. P. Crowe, Kansas City, Mo.; Paul C. Ford, Kansas City, Mo.

On the inside of the table from left to right are: F. S. Kelly, Jr., Shreveport, La.; D. W. Reeves, Tulsa, Okla.; C. J. Dodds, Lawrence, Kansas; H. C. Porter, Kansas City, Mo.; C. U. Daniels, Tulsa, Okla.; C. B. Wilson, Little Rock, Ark.; J. W. West, Jr., New York, N. Y.; J. C. Sackman, Hammond, Ind.

Also attending the meeting but not shown in the picture were: A. L. Mullergren, Kansas City, Kansas; F. L. Rupp, Independence, Kansas; Jack Torbert, Kansas City, Kansas.

New Committees Natural Gas Section Meet in Kansas City

In preparation for the 37th Annual Natural Gas Convention, American Gas Association, New Orleans, La., May 4-7, 1942, the following committees of the Natural Gas Section, A.G.A. met in Kansas City, Missouri on December 12:

General Program Committee—Burt R. Bay, Chairman; President, Northern Natural Gas Company, Omaha, Nebr.

Natural Gas Production Committee—C. U. Daniels, Chairman; Vice-Pres., Oklahoma Natural Gas Co., Tulsa, Okla.

Natural Gas Transmission Committee—B. M. Laulhere, Chairman; Technical Superv., Southern California Gas Company, Los Angeles, Calif.

Residential Natural Gas Sales Committee—C. B. Wilson, Chairman; New Business Mgr., Arkansas Louisiana Gas Co., Little Rock, Ark.

Industrial & Commercial Natural Gas Sales Committee—D. W. Reeves, Chairman; Ind. Sales Mgr., Oklahoma Natural Gas Co., Tulsa, Okla.

At this meeting plans were drafted for a program which will endeavor to solve the war emergency problems of the Natural Gas Industry. It is planned to have full discussions on these problems as they apply to production and transmission of natural gas as well as to the sale of natural gas. It is the purpose of the 1942 Convention to look to the urgent questions of the hour and at the same time to plan for the future in order that the Natural Gas Industry may continue to uphold its record of service to the public.

Ruthenburg Elected President Indiana Chamber of Commerce

A new honor, the presidency of the Indiana State Chamber of Commerce, has been conferred on Louis Ruthenburg, president of Servel, Inc. Mr. Ruthenburg was elected at a general membership meeting of the Chamber, held in Indianapolis on December 4.

Other new officials elected at the meeting to serve with Servel's public-spirited president were: Dean H. Mitchell, the first vice-president, president of the Northern Indiana Public Service Company; second vice-president, George F. Olive, head of a leading accounting firm in Indianapolis, and third vice-president, John W. Crise, of Fort Wayne, who is executive assistant of the General Electric Company. Other leading industrialists and business men in Indiana were elected as directors.

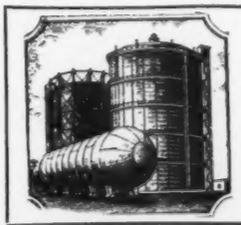
Mr. Ruthenburg, who became president of Servel, Inc., in the Spring of 1934, has taken an active interest in local civic, business and social welfare organizations in Evansville where the Servel plant is located.

Southern Gas Association Meeting To Be Held in Atlanta, February 9-11, at Biltmore Hotel

According to L. L. Baxter, Secretary of the Association, a program, in touch with the present day developments, will be in vogue. Outstanding speakers who will appear on the program will be A. B. Patterson, president of the New Orleans Public Service Company, delivering a talk on "Personnel," and George S. Hawley, President of the American Gas Association.

Frank C. Smith, of Houston Natural Gas Company, will deliver an up-to-the-minute address on "The Institute of Gas Technology." George S. Jones, of Servel Inc., and Davis DeBard are among the outstanding speakers to be heard on this program.

H. Carl Wolf, president of the Atlanta Gas Light Company, is President of the Southern Gas Association. The Residential Sales Conference is headed by J. H. Warden of the Oklahoma Natural Gas Company; the Industrial Gas Sales Conference is headed by H. G. D'Spain of the Mississippi Public Service Company; the Technical Gas Sales Conference is headed by H. N. Oldham of the New Mexico Eastern Gas Company; and the Home Service Conference is headed by Miss Emma Wood of the Louisiania Public Utilities Company, Inc.



STACEY BROTHERS
Gas Construction Co., Inc.
"STACEY-KLONNE" & TELESCOPIC GAS HOLDERS "STACEY BULLET" PRESSURE HOLDERS
PURIFIERS AND STEEL PLATE CONSTRUCTION
Executive Offices: Cincinnati, Ohio
Eastern Office: 21 West St., N. Y. C.

Oklahoma Utilities Association

At a meeting of the Board of Directors of the Oklahoma Utilities Association held in Tulsa, Oklahoma, December 11, 1941, Officers and Directors for the year 1942 were elected as follows:

President—W. L. Woodward, President Zenith Gas System, Inc., Alva, Oklahoma.

First Vice-President—J. C. Happenny, President Oklahoma Power & Water Co., Sand Springs, Oklahoma.

Second Vice-President—E. C. Joullian, President Consolidated Gas Utilities Corporation, Oklahoma City, Oklahoma.

Treasurer—B. M. Lester, Vice-President and Treasurer Oklahoma Gas & Electric Company, Oklahoma City, Oklahoma.

Secretary—Miss Kate A. Niblack, Oklahoma Utilities Association, 626 Biltmore Hotel, Oklahoma City, Oklahoma.

The Annual Convention of the Association is set for March 23-24, 1942, Biltmore Hotel, Oklahoma City, Oklahoma.

CONVENTION CALENDAR

January

9-10 *Louisiana Engineering Society* St. Charles Hotel, New Orleans.

14 *New England Gas Association Operating Division,* Boston, Mass.

23 *Pennsylvania Gas Association,* Annual Mid-Winter Sales Meeting, Benjamin Franklin Hotel, Philadelphia.

February

9–11 *Southern Gas Association and A.G.A. Southern - Southwestern Gas Sales Conference,* Biltmore Hotel, Atlanta, Ga.

March

12–13 *A.G.A. Conference on Industrial Gas Sales and A.G.A. Hotel, Restaurant and Commercial Sales Conference,* Pittsburgh.

19–20 *New England Gas Association* Annual Convention, Hotel Statler, Boston, Mass.

23-24 *Oklahoma Utilities Ass'n.* Biltmore Hotel, Oklahoma City.

April

13–15 *Mid-West Gas Association,* Sioux City, Ia.

19–21 *Gas Meters Association of Florida - Georgia,* Savannah, Ga.

21–23 *Southwestern Gas Measurement Short Course,* Norman, Okla.

May

4–7 *Natural Gas Section American Gas Association,* Annual Convention, Roosevelt Hotel, New Orleans, La.

June

4–5 *Canadian Gas Association,* 35th Annual Meeting, Windsor Hotel, Montreal.

Pennsylvania Gas Association

Highlight of the Pennsylvania Gas Association's annual Mid-Winter Sales Meeting, to be held on January 23, 1942, at the Benjamin Franklin Hotel, Philadelphia, will be the first presentation in the East of the famous "Cavalcade of Gas."

A brand new, lively extravaganza, the "Cavalcade of Gas" depicts the history, growth, and development of gas and gas appliances. It has been shown only on two other occasions, and both times drew capacity crowds and enthusiastic responses. Since this will be the first showing in the East—and probably the last showing for some time—all P. G. A. members, and others in the industry who may be interested, are urged to see it.

The "Cavalcade" offers as impresario E. Carl Sorby, popular sales promotion director of the George D. Roper Corporation. This role gives Sorby a perfect opportunity to display his many dramatic talents, which have won him a wide following throughout the gas industry. Other roles are capably filled by well-known representatives of gas appliance manufacturers, including R. L. Cox, of the Detroit-Michigan Stove Company; Clarence Spiegel, of Servel, Inc.; L. C. Ginn, of the American Stove Company; Ted Carrow, of the Cribben and Sexton Company; E. W. Cone, of the Ruud Manufacturing Company, and H. C. Gurney, of the Surface Combustion Company.

All of these representatives took active part in the "Cavalcade's" last showing in Minneapolis. They have been recast in their respective parts because of their experience with the show, and their fine performances in the two previous productions.

In addition to the "Cavalcade," timely discussions of new business phases of the gas industry will be offered the P. G. A. group. John E. Bogan, sales promotion manager, Association of Gas Appliance and Equipment Manufacturers, will outline "Selling Under Today's Conditions," and G. M. Rohde, Jr., manager of research, Ruud Manufacturing Company, will explain "New Methods of Promoting Water Heater Sales."

Theodore R. McKeldin, a prominent Baltimore lawyer, will be guest speaker at the luncheon.

Construction Begins on M-H Plant Addition

For the fourth time in five years Minneapolis-Honeywell Regulator Company is building an addition to its Minneapolis plant, it was announced by C. B. Sweatt, Vice-President in charge of sales.

Rising four stories above the north wing just completed last year, the 65,000 square feet of added floor space is necessary because of recent defense orders and to maintain the best possible service to its customers.

REED'S 4 WHEEL Razor Blade Pipe Cutters

IDEAL FOR ANY TRENCH OR OTHER CLOSE QUARTER JOBS

$5.46 F. O. B. ERIE

Capacity ½" to 2"

Weight 5 lbs.

The REED FOUR WHEEL Cutter operates with a short back and forth motion through only one-third of a circle. Each of the four wheels exerts the same pressure on the pipe, and all 4 therefore cut evenly and completely through the pipe at the same time.

Equipped with Reed special alloy RAZOR BLADE Wheels, which cut with remarkable ease, leave little burr, and have a long life of useful service.

A sample cutter for test and trial may be ordered on memorandum invoice, to be paid for if retained or returned for credit if unsatisfactory. Try it once, and you will use no other.

REED MFG. COMPANY
1436 W. 8th Street • ERIE, PA.

Gas Hydrates in Pipe Lines

"Freezing" of natural-gas pipe lines in cold weather by the formation of snow-like compounds called gas hydrates is being investigated by the Bureau of Mines through temperature surveys of certain Western pipe lines, according to a report submitted today by Dr. R. R. Sayers, Director of the Bureau, to Secretary of the Interior Harold L. Ickes.

Many defense industries and domestic consumers depend upon an unimpeded flow of natural gas through the vast pipe line systems of the Nation, the report stated. The Bureau of Mines in cooperation with the American Gas Association is seeking to eliminate gas-hydrate obstructions in the pipe lines, thus contributing to national defense by permitting an uninterrupted supply of this vital fuel to cities and industries far removed from gas fields.

The gas hydrates form in pipe lines at temperatures as high as 60 degrees Fahrenheit, the report revealed, and their elimination constitutes a major engineering problem in the transmission of natural gas through pipe lines. Moisture condenses in the pipes and unites chemically to form the ice-like substance. To predict the formation of gas hydrates and to study possible control methods, according to the report, it is necessary to know the temperature of buried pipe lines transporting the gas.

Bureau chemists established temperature-reading stations on a 340-mile natural-gas pipe line extending from the Texas Panhandle gas fields to Denver, Colo., and control stations where temperatures were recorded at the surface and at various depths to a maximum of ten feet below the ground level, the report stated. Measurements at those stations for nearly four years showed that the temperature of the gas in the pipes generally approximated the temperature of the ground at the depth of the center of the pipe, rising in summer and falling in winter. The ground temperature usually lagged behind changes in atmospheric temperature. The lowest pipe line temperatures were recorded in February or March, and the highest in August or September, the report revealed.

Fluctuations in the temperature of the gas as it crossed under a river bed were recorded by thermometers installed in the pipe line on either side of the river. Some decrease in temperature of the gas due to cooling of the earth by the river water was noted, but even when the river was full of ice the gas flowing at a temperature of 42° F. was cooled only to 40° F. by the river crossing. Other temperature changes exclusive of seasonal variations were observed because of abrupt changes in depth of the pipe line and the disturbing influences of compressor stations.

A copy of the report may be obtained by writing to the Bureau of Mines, Department of the Interior, Washington, D. C., for Report of Investigations 3590, "Temperatures of Natural Gas Pipe Lines and Seasonal Variations of Underground Temperatures," by W. M. Deaton and E. M. Frost, Jr.

AMBIDEXTROUS, TWO-FISTED WELDER HAS HANDS FULL

That American welders have their hands full with the defense effort is generally acknowledged, but rarely is a picture taken of a welder as busy as R. H. Oliver of St. Louis, Missouri.

Oliver, a two-fisted welder if there ever was one, sent the accompanying photograph to A. F. Davis, vice-president of The Lincoln Electric Company of Cleveland, Ohio. He is welding tractor rollers with both hands, according to his letter. The electrode he is manipulating with his right hand is receiving current from a 400 ampere portable welder and the one in his left hand is "powered" by a 150 ampere welder, the letter states.

National Advertising Committee

Thomas J. Strickler, Chairman of the gas industry's national advertising committee, announces the appointment of three additional members to the Copy Committee which works with the agency, McCann-Erickson, Inc., of New York, in executing the details of the campaign.

The three new appointments are J. S. Spaulding, Advertising Manager, of the Southern California Gas Company, Los Angeles, Calif., who has served as a member of the national committee since the inauguration of the campaign six years ago; Thomas H. Spain, Advertising Manager, Public Service Electric & Gas Company, Newark, N. J., and Charles W. Kimball, Sales Manager, The Hartford Gas Company, Hartford, Conn.

Gas Fired Melting Furnaces. Bulletin 300 of Fisher Furnace Co., 1738 N. Kolmar Ave., Chicago, describes their aluminum melting furnaces. These are equipped with proportional single valve controls. Multiple burners operating from a common manifold are recommended for their operation. Copy of the bulletin on request.

GOLDEN BROWN MASTERFRYER

COMPLETE COMMERCIAL LINE OF DEEP FAT FRYERS

• LONG • LIFE • POTS •

• HIGHER • EFFICIENCY

FOR RESTAURANTS, HOTELS, INSTITUTIONS AND BAKERIES

A CREDIT TO THE GAS INDUSTRY

MANUFACTURED BY

GOLDEN BROWN APPLIANCE MFG. CO.

LYNN MASS.

PROMPT DELIVERIES

GOODMAN — USED SINCE 1897 — Z "HANDLE & LOCKING SLEEVE — GAS MAIN STOPPER

The Reliable Shut-Off for Street Mains

THE GOODMAN STOPPER

Now has the "Z" handle for easy manipulation. When locked in place it **holds.** Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.

Ask for circulars on this and other distribution equipment.

Nearly a half century of service to the Gas Industry.

Safety Gas Main Stopper Co.

523 Atlantic Avenue. Brooklyn. New York

Oklahoma Utilities Association

At a meeting of the Board of Directors of the Oklahoma Utilities Association held in Tulsa, Oklahoma, December 11, 1941, Officers and Directors for the year 1942 were elected as follows:

President—W. L. Woodward, President Zenith Gas System, Inc., Alva, Oklahoma.

First Vice-President—J. C. Happenny, President Oklahoma Power & Water Co., Sand Springs, Oklahoma.

Second Vice-President—E. C. Joullian, President Consolidated Gas Utilities Corporation, Oklahoma City, Oklahoma.

Treasurer—B. M. Lester, Vice-President and Treasurer Oklahoma Gas & Electric Company, Oklahoma City, Oklahoma.

Secretary—Miss Kate A. Niblack, Oklahoma Utilities Association, 626 Biltmore Hotel, Oklahoma City, Oklahoma.

The Annual Convention of the Association is set for March 23-24, 1942, Biltmore Hotel, Oklahoma City, Oklahoma.

CONVENTION CALENDAR

January

9-10 *Louisiana Engineering Society* St. Charles Hotel, New Orleans.

14 *New England Gas Association Operating Division,* Boston, Mass.

23 *Pennsylvania Gas Association,* Annual Mid-Winter Sales Meeting, Benjamin Franklin Hotel, Philadelphia.

February

9-11 *Southern Gas Association and A.G.A. Southern-Southwestern Gas Sales Conference,* Biltmore Hotel, Atlanta, Ga.

March

12-13 *A.G.A. Conference on Industrial Gas Sales and A.G.A. Hotel, Restaurant and Commercial Sales Conference,* Pittsburgh.

19-20 *New England Gas Association* Annual Convention, Hotel Statler, Boston, Mass.

23-24 *Oklahoma Utilities Ass'n.* Biltmore Hotel, Oklahoma City.

April

13-15 *Mid-West Gas Association,* Sioux City, Ia.

19-21 *Gas Meters Association of Florida-Georgia,* Savannah, Ga.

21-23 *Southwestern Gas Measurement Short Course,* Norman, Okla.

May

4-7 *Natural Gas Section American Gas Association,* Annual Convention, Roosevelt Hotel, New Orleans, La.

June

4-5 *Canadian Gas Association,* 35th Annual Meeting, Windsor Hotel, Montreal.

Pennsylvania Gas Association

Highlight of the Pennsylvania Gas Association's annual Mid-Winter Sales Meeting, to be held on January 23, 1942, at the Benjamin Franklin Hotel, Philadelphia, will be the first presentation in the East of the famous "Cavalcade of Gas."

A brand new, lively extravaganza, the "Cavalcade of Gas" depicts the history, growth, and development of gas and gas appliances. It has been shown only on two other occasions, and both times drew capacity crowds and enthusiastic responses. Since this will be the first showing in the East—and probably the last showing for some time—all P. G. A. members, and others in the industry who may be interested, are urged to see it.

The "Cavalcade" offers as impresario E. Carl Sorby, popular sales promotion director of the George D. Roper Corporation. This role gives Sorby a perfect opportunity to display his many dramatic talents, which have won him a wide following throughout the gas industry. Other roles are capably filled by well-known representatives of gas appliance manufacturers, including R. L. Cox, of the Detroit-Michigan Stove Company; Clarence Spiegel, of Servel, Inc.; L. C. Ginn, of the American Stove Company; Ted Carrow, of the Cribben and Sexton Company; E. W. Cone, of the Ruud Manufacturing Company, and H. C. Gurney, of the Surface Combustion Company.

All of these representatives took active part in the "Cavalcade's" last showing in Minneapolis. They have been recast in their respective parts because of their experience with the show, and their fine performances in the two previous productions.

In addition to the "Cavalcade," timely discussions of new business phases of the gas industry will be offered the P. G. A. group. John E. Bogan, sales promotion manager, Association of Gas Appliance and Equipment Manufacturers, will outline "Selling Under Today's Conditions," and G. M. Rohde, Jr., manager of research, Ruud Manufacturing Company, will explain "New Methods of Promoting Water Heater Sales."

Theodore R. McKeldin, a prominent Baltimore lawyer, will be guest speaker at the luncheon.

Construction Begins on M-H Plant Addition

For the fourth time in five years Minneapolis-Honeywell Regulator Company is building an addition to its Minneapolis plant, it was announced by C. B. Sweatt, Vice-President in charge of sales.

Rising four stories above the north wing just completed last year, the 65,000 square feet of added floor space is necessary because of recent defense orders and to maintain the best possible service to its customers.

REED'S 4 WHEEL Razor Blade Pipe Cutters

IDEAL FOR ANY TRENCH OR OTHER CLOSE QUARTER JOBS

$5.46 F. O. B. ERIE

Capacity
½" to 2"
Weight 5 lbs.

The REED FOUR WHEEL Cutter operates with a short back and forth motion through only one-third of a circle. Each of the four wheels exerts the same pressure on the pipe, and all 4 therefore cut evenly and completely through the pipe at the same time.

Equipped with Reed special alloy RAZOR BLADE Wheels, which cut with remarkable ease, leave little burr, and have a long life of useful service.

A sample cutter for test and trial may be ordered on memorandum invoice, to be paid for if retained or returned for credit if unsatisfactory. Try it once, and you will use no other.

REED MFG. COMPANY
1436 W. 8th Street • ERIE, PA.

Gas Hydrates in Pipe Lines

"Freezing" of natural-gas pipe lines in cold weather by the formation of snow-like compounds called gas hydrates is being investigated by the Bureau of Mines through temperature surveys of certain Western pipe lines, according to a report submitted today by Dr. R. R. Sayers, Director of the Bureau, to Secretary of the Interior Harold L. Ickes.

Many defense industries and domestic consumers depend upon an unimpeded flow of natural gas through the vast pipe line systems of the Nation, the report stated. The Bureau of Mines in cooperation with the American Gas Association is seeking to eliminate gas-hydrate obstructions in the pipe lines, thus contributing to national defense by permitting an uninterrupted supply of this vital fuel to cities and industries far removed from gas fields.

The gas hydrates form in pipe lines at temperatures as high as 60 degrees Fahrenheit, the report revealed, and their elimination constitutes a major engineering problem in the transmission of natural gas through pipe lines. Moisture condenses in the pipes and unites chemically to form the ice-like substance. To predict the formation of gas hydrates and to study possible control methods, according to the report, it is necessary to know the temperature of buried pipe lines transporting the gas.

Bureau chemists established temperature-reading stations on a 340-mile natural-gas pipe line extending from the Texas Panhandle gas fields to Denver, Colo., and control stations where temperatures were recorded at the surface and at various depths to a maximum of ten feet below the ground level, the report stated. Measurements at those stations for nearly four years showed that the temperature of the gas in the pipes generally approximated the temperature of the ground at the depth of the center of the pipe, rising in summer and falling in winter. The ground temperature usually lagged behind changes in atmospheric temperature. The lowest pipe line temperatures were recorded in February or March, and the highest in August or September, the report revealed.

Fluctuations in the temperature of the gas as it crossed under a river bed were recorded by thermometers installed in the pipe line on either side of the river. Some decrease in temperature of the gas due to cooling of the earth by the river water was noted, but even when the river was full of ice the gas flowing at a temperature of 42° F. was cooled only to 40° F. by the river crossing. Other temperature changes exclusive of seasonal variations were observed because of abrupt changes in depth of the pipe line and the disturbing influences of compressor stations.

A copy of the report may be obtained by writing to the Bureau of Mines, Department of the Interior, Washington, D. C., for Report of Investigations 3590, "Temperatures of Natural Gas Pipe Lines and Seasonal Variations of Underground Temperatures," by W. M. Deaton and E. M. Frost, Jr.

AMBIDEXTROUS, TWO-FISTED WELDER HAS HANDS FULL

That American welders have their hands full with the defense effort is generally acknowledged, but rarely is a picture taken of a welder as busy as R. H. Oliver of St. Louis, Missouri.

Oliver, a two-fisted welder if there ever was one, sent the accompanying photograph to A. F. Davis, vice-president of The Lincoln Electric Company of Cleveland, Ohio. He is welding tractor rollers with both hands, according to his letter. The electrode he is manipulating with his right hand is receiving current from a 400 ampere portable welder and the one in his left hand is "powered" by a 150 ampere welder, the letter states.

National Advertising Committee

Thomas J. Strickler, Chairman of the gas industry's national advertising committee, announces the appointment of three additional members to the Copy Committee which works with the agency, McCann-Erickson, Inc., of New York, in executing the details of the campaign.

The three new appointments are J. S. Spaulding, Advertising Manager, of the Southern California Gas Company, Los Angeles, Calif., who has served as a member of the national committee since the inauguration of the campaign six years ago; Thomas H. Spain, Advertising Manager, Public Service Electric & Gas Company, Newark, N. J., and Charles W. Kimball, Sales Manager, The Hartford Gas Company, Hartford, Conn.

Gas Fired Melting Furnaces. Bulletin 300 of Fisher Furnace Co., 1738 N. Kolmar Ave., Chicago, describes their aluminum melting furnaces. These are equipped with proportional single valve controls. Multiple burners operating from a common manifold are recommended for their operation. Copy of the bulletin on request.

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Southern Counties Gas Company Announces Changes in Organization

Retirement of M. R. Thompson as first vice president in charge of construction, Southern Counties Gas Company, on December 1, brought about the following changes in the company's general office organization:

F. A. Hough, formerly distribution engineer, was made executive engineer and assumes general supervision of operation and construction.

He will be assisted by C. F. Briscoe, formerly Southern California Gas Company engineer, H. A. Faull, and N. K. Senatoroff. Briscoe's title will be construction engineer; Faull, formerly assistant distribution engineer, will be meter and regulator engineer; Senatoroff, formerly research engineer, will be chemical engineer.

Robert F. Gibbs, since 1939 commercial agent for Southern Counties Gas Company's Eastern district with headquarters in Pomona, was appointed commercial agent for the company in Santa Maria, effective December 1.

His place is being filled by Floyd S. Parmenter, who has served since 1934 as sales representative in Monrovia. Parmenter has been one of the most consistent salesmen with the company, having won numerous prizes in American Gas Association contests during the past several years.

Transfer of Gibbs to Santa Maria was occasioned by the recent merger of the Santa Maria Gas Company with Southern Counties Gas Company, creating a "Northern District." In addition to area in and around Santa Maria, Northern District territory includes the cities of San Luis Obispo, Paso Robles and beach towns as far north as Morro Bay.

Dingwell Appointed To Personnel Practices Committee of A. G. A.

James D. Dingwell, Jr., Assistant Vice President in Charge of Personnel Relations of the Washington Gas Light Company, Washington, D. C., has been appointed Chairman of the Committee on Personnel Practices of the American Gas Association by George S. Hawley, President of the Association. This committee is now in its sixth year as an Association activity and is engaged in a continuous study of the Industrial relations problems of the gas industry.

Mr. Dingwell has been active in the affairs of the American Gas Association having served in the Commercial Section prior to becoming a member of the Committee on Personnel Practices in 1938.

Albert W. Humm Joins Hixson-O'Donnell Agency

Albert W. Humm has joined Hixson-O'Donnell Advertising, Inc., New York, to organize and manage a Public Utility and Home Appliance Department. Mr. Humm has had wide experience with public utility and home appliance advertising and promotion. For twenty years he was advertising and sales promotion manager of Standard Gas Equipment Corporation, manufacturers of domestic and hotel ranges and equipment. During this period he originated many effective sales promotion and advertising programs for both the manufacturer and the utility.

At Standard Gas Equipment Corporation, Mr. Humm's experience included training and directing of the sales force, particularly the men engaged in the promotion of Smoothtop gas ranges. He was also active in the work of the American Gas Association.

After leaving Standard Gas Equipment Corporation, Mr. Humm became associated with the advertising agency of Williams & Saylor, Inc., as director of the Gas Merchandising Division. In this capacity he created and developed the first national water heater program of the Association of Gas Appliance and Equipment Manufacturers. And for several years he handled the national gas refrigerator program.

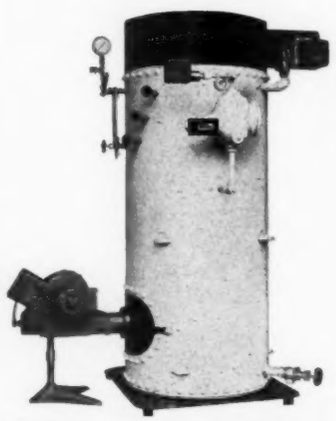
Mr. Humm goes to Hixson-O'Donnell with eight years of advertising agency experience added to his twenty years in the gas appliance and public utility business. The Public Utility and Home Appliance Department which he manages at Hixson-O'Donnell will render a fully rounded merchandising, advertising and sales promotion service to a number of utility and home appliance accounts.

A.S.H.V.E. Will Meet in Philadelphia

The week of Jan. 26, 1942, will mark the occasion of the 48th Annual Meeting of the American Society of Heating and Ventilating Engineers at the Bellevue-Stratford Hotel, Philadelphia, Pa., the 7th International Heating and Ventilating Exposition, at the Commercial Museum, 28th National Convention of the National Warm Air Heating and Air Conditioning Association at Benjamin Franklin Hotel, Philadelphia, Pa.

Registration for A.S.H.V.E. members will commence Jan. 25 at the Bellevue-Stratford and the first business session will open at 9:00 a.m. on Jan. 26. The technical sessions will be held each morning at the headquarters hotel and the afternoon sessions will be held in the ball room at the Exposition. There will be seven technical sessions and the Committee on Arrangements for the Philadelphia Chapter have planned a number of entertainment features.

LATTNER
GAS — OIL BOILER
3 HP to 35 HP.



Burns natural gas or regular furnace oils with equal efficiency.

P. M. Lattner Mfg. Company
Cedar Rapids, Iowa

SUPERIOR GAS METERS

For Sound Values and Continuous Operating Economy

Meters for Domestic and Industrial Use. All Sizes 5B to 60C.
Wet Test and Demonstration Meters — Diaphragms —
Service Cleaners — Provers — Meter Repairs

Write for details and quotations

SUPERIOR METER COMPANY, INC.
167 41st Street ***Brooklyn, N. Y.***

Emergency Air Raid Equipment

By Mary Ann Royal

The Pacific Coast cities are already on the alert. Not as much publicity has been given to the problem of combating the foe along our eastern flank. But the cities of New York and Washington are certainly most conscious at the moment—New York because of its great port and prominent place as a center of population and Washington because it is the Nation's Capital.

Even now the Capital has every hair stiffened, and antiaircraft weapons are mounted atop hotels and government buildings; bristling bayonetry shows atop the bridge railings, and the license tag USSS is appearing on many automobiles that previously carried non-descript numbers. This identification, of course, for the U. S. Secret Service.

Three short blocks from the White House is the building of Washington's twenty-four hour newspaper, The Washington Times-Herald, housing every minute of the full twenty-four hours an average of 600 employees. The superintendent of this building for the past eight months has been thinking about the safety of every one under its roof, in the event of air attack. When the Japs hit Pearl Harbor, he was ready with his requisition sheet, which will interest many another newspaper plant, factory, office and apartment building. It looked something like this:

Blackout curtains, 3 ply, white two sides, center black .....$	356.00
Four stirrup pumps @ $10.50—E. C. Brown Co., Rochester ..	42.00
Six street sweeper brooms @ $1.00	6.00
Six long handle shovels @ $.50..	3.00
Four fire axes—6 lb. apiece @ $3.50—American LaFrance ..	14.00
Two asbestos suits (these include helmets, hats and gloves @ $25.00—American LaFrance	50.00
25 fire extinguishers—2½ gallon capacity each (soda & acid) @ $18.00—American LaFrance ..	450.00
15 fire extinguishers—1 qt. liquid @ $14.00—American LaFrance	210.00
6 pair asbestos gloves (long) elbow length @ $3.50—American LaFrance	21.00
3½ dozen fire buckets (round bottom) @ $6.95 dozen	24.33
20 bags builders sand @ $.20 per bag, plus $.50 delivery chg. ..	4.50
6 composition helmets (three different sizes) @ $3.50	21.00
4 army cots @ $2.95	11.80
60 Boy Scout whistles @ $.35 ..	21.00
200 flashlights @ $.30, plus extra battery $.08	76.00
	$1,310.63

Except where supplier is mentioned, all items came from local suppliers. Composition helmets, kind used by riveters (do not buy steel). Others are stronger and no danger of electrocution in case of falling wiring, etc. Boy Scout whistles because of lack of central alarm system.

This represents the basic purchases and more will be added later. The plan for the evacuation of The Times-Herald Building is being accepted as a model for the use of other Washington buildings, including office, apartment and department stores.

Gumz Becomes Manager of Commer. and Indus. Sales P.G.&E.

J. H. Gumz has been appointed Manager, Commercial and Industrial Sales, for the Pacific Gas and Electric Company, San Francisco, succeeding the late Harry Carroll. A member of Pacific Coast Gas Association for 20 years, much of his activity with P. G. and E. has been in the gas sales department for commercial and industrial uses. He attended the University of Illinois, and entered the utility business in 1913 with Western United Gas and Electric Company in Illinois and later was with Public Service Company of Northern Illinois. He joined P. G. and E. in 1922. In his new position he will be manager of both gas and electric sales.

Barrett Company Consolidated With Parent Company

Effective December 1st, The Barrett Company, 40 Rector Street, New York, has been consolidated with its parent company, Allied Chemical & Dye Corporation. Hereafter its business will be conducted as The Barrett Division of the parent company.

Except for change in name, operations will be conducted as heretofore by the same personnel.

H. J. Mandel Joins Richmond Radiator Staff

Henry J. Mandel who has been new business manager for the Associated Gas and Electric System for the past ten years and representative of the Surface Combustion Co. has joined the Richmond Radiator Company of Uniontown, Pa. as sales representative and assistant to Chief Engineer Marks.

Mr. Mandel brings with him a wide and varied background of experience in the gas heating field where the products of this Company are showing rapid growth.

James F. Hunter Retires

James F. Hunter, vice-president of Consolidated Edison Company of New York, Inc., retired from the company on December 31. Mr. Hunter spent thirty-sevei years in the gas branch of Consolidated Edison System Companies.

During Mr. Hunter's career, the company built two of the world's largest gas plants, at Astoria, Long Island, and at Hunts Point in the Bronx, much of these big undertakings coming under his direct supervision. In 1904 Mr. Hunter started as a draftsman in the Construction Department of Consolidated Gas Company (which was the name of the company then) and became successively engineer's assistant, field engineer, and engineer of construction. He was elected an assistant vice-president of Consolidated Edison in 1937, three years later becoming vice-president in charge of gas production, technical service, and gas storage and control.

Building Industry Cooperation

(Continued from page 18)

Meister Realty Company has sold ten houses, all gas, and are planning the construction of 24 more.

August Tobler, local builder who was formerly identified with houses in the higher priced brackets has turned his attention to building in the $5,000 to $6,000 class. Twenty such houses have been finished and sold, and forty more are being planned or are under construction. Gas for everything, except refrigeration. Refrigeration sales have not kept pace with the sales of other gas utilization equipment, for the reason as shown by a survey, that over 80 per cent of the families moving into new homes in the Hartford area bring good serviceable electrical refrigeration equipment with them.

Figures compiled by the utility disprove the impression that gas heating must rely on the high priced residential market for its volume. During the first eight months of 1940, only 6.5 per cent of the newly occupied homes were gas heated. For the same period in 1941 the average had increased over three fold, to 20.5 per cent.

The average number of meters on the Hartford lines during the first nine months of 1940 was 58,946; 60,314 for the comparable months in 1941. Of the new meters it is worthy of note that five are master meters on government projects, through which 2,500 new families are receiving gas service.

The keynote of the Hartford sales policy, as enunciated by its General Sales Manager, Howard R. Carlson, lies in "serious study, sober thinking and sound promotion." Results obtained to date give every indication that this policy is sufficiently fundamental to be as effective in war as it has been in peace.

National Defense and The Gas Industry

(Continued from page 16)

The following references may interest you:—

Emergency Repairs of C. I. Mains (British) American Gas Journal May 1941, p. 53

Shutting off Mains from a distance, English Gas Journal April 12, 1939, p. 98

Shutting off Gas in Air Raids, English Gas Journal Feb. 5, 1941

Isolation of Mains, English Gas Journal April 12, 1939

Extinguishing Fires in Mains, English Gas Journal Nov. 8, 1939

In Mr. Bennie's paper he says—Each emergency truck should carry a book containing full information of the position and sizes of mains in all streets. This is an excellent idea. He says also that gangs should know how much material should be injected into each size of main to plug it. Materials could include plasticized pitch that could be removed chemically or by an electric heating element, or even a weak mixture of clay and sand to be dispersed with a hose, the water to be removed later from the nearest syphon.

To remove water from flooded mains he suggests inserting at lowest points 2" upstand pipes, and that engine driven emergency centrifugal pumps should be provided. He also suggests open mains in craters can be plugged by slinging clay at them using a mud slinger designed after the fashion of a sand slinger used in foundries. Asbestos shields might come in useful.

The Westchester Lighting Company of Consolidated Edison, New York, has a new mercury seal which may be placed over a gas main regulator said to be effective under flood conditions—patent applied for. A.G.A. Monthly September 1941.

You will probably have heard of the small trailer fire pumps to fit behind cars and taxis used in England. These are now available in the U.S.A., as are also stirrup hand pumps used for extinguishing incendiaries.

There is a system in use composing of a three man crew in an automobile, called an "observer" patrol. They report what happens in a raid and can turn off gas to a house and know where the valve is located.

The candle power of hurricane lamps must not be over 1.0, and no light to show above the horizontal, or cast an appreciable glow on the road surface.

An area can be divided into districts with a Captain and perhaps 11 men per district, preferably volunteers who live in the district concerned. They will quickly learn all they should know about their area.

The recent broken mains in Brooklyn, during a storm on August 26 last, almost duplicated a bombing effect, and the main was allowed to burn all night. Mr. C. S. Goldsmith of the Brooklyn Union Gas Company has set up a "crater" containing various mains and services. Here he trains his men to put out fires and etc. under conditions likely to prevail after an actual bombing—an excellent idea. He gives periodic demonstrations which you may see and there is to be one in Brooklyn this afternoon. He also has a color movie of a demonstration. There is an article about it in the November American Gas Journal. While on the subject of distribution it must be remembered that there is a probability of a large influx of population, mostly women and children, into more remote areas from large metropolitan areas which will adversely affect each. Also communal feeding may be used in some areas.

Pressure Control

Mr. Bennie suggests that pressures be reduced during raids, but not below normal gas holder pressures, to lessen risk of fire or gassing people near broken mains or services; and of course broken mains may completely cut off supply. It is suggested the press and radio be used to warn customers of possible "outages." If pressures are not reduced the blast from a high explosive bomb will put out all pilots for a half mile radius. Pressures must be rapidly raised directly after raids, and the public must be warned to expect such rapid fluctuations.

Where mains are carried on brackets across bridges carrying electric railways or trolleys they should be insulated from the bridge and have insulated joints at the bridge ends.

"Notes on Town Gas for Air Raid Wardens"

Institution of Gas Engineers publication No. 227, Nov. 1940, 7 pp. was originally prepared by the London Regional Gas Centre explains system of mains, services and meters employed by Gas Utilities, and how to handle ignited and unignited gases in streets and buildings.

Of interest are the following points:—

Ordinary Service, Civilian Duty and Civilian Respirators do not offer protection against coal gas. Gas men generally use the Service type respirator specially adapted to carry an attachment for protection against coal gas.

Concerning street mains on fire:—

Wardens are told to take no action to extinguish fire. The fire brigade or Auxiliary Fire Service will prevent spread of fire and keep surroundings cool. Extinction of flames and shutting off of gas must be left to Gas Undertaking's personnel. Unignited escaping gas from street mains must be stopped or ignited by A. R. Wardens. Gas escaping into adjacent premises should be diffused by opening windows, doors, manhole covers, etc., and points out casually "It should, of course, be appreciated that a high explosive bomb will automatically ventilate surrounding premises by shattering windows."

Broken service pipes up to 2" diameter whether ignited or not can be taken care of by Wardens or rescue parties until Gas Company men arrive and explain how to temporarily stop a small pipe with moist clay, soap or wet rag. Clay may be applied with a spade or preferably with the "Redhill" container used for incendiaries. This can be filled with clay and plunged over the pipe end, or about half a bucket of clay can be thrown at, or dropped in, the end of the pipe.

For carcass pipe damage:—

Turn off meter. If this is impossible use service pipe method of handling.

I quote verbatim the remainder of the booklet—

Reporting

"Report clearly, and as quickly as possible on your M. 1 the precise locality and exact nature of the damage as far as you are able to judge it. Your Local Authority control center will notify the appropriate depot of the Gas Undertaking responsible for dealing with the damage, and an accurate assessment of this will be of great assistance to the Undertaking in sending out repair parties. Nothing of a technical nature is required in your report; simply a straightforward statement indicating, if possible, whether the damage affects (I) MAINS, (II) SERVICE PIPES, or (III) CARCASS (INTERNAL) PIPES.

This information is required because the Gas Undertaking Civil Defense personnel are divided into

(1) Mains Repair Parties.

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(2) Smaller parties for dealing with damaged service pipes.
(3) Fitters for work inside the premises.

Points to Remember

1. There is nothing to be afraid of with gas if the action suggested is taken and common sense is applied.
2. Never ignite a suspected leak.
3. The mixture with the least smell of gas may be the most explosive.
4. The smell of town gas cannot be detected when wearing an Ordinary Service, Civilian Duty or Civilian Respirator.
5. Do not attempt to extinguish a large gas flame.
6. Water must not be used on any gas flame.
7. If you do anything to gas equipment of any kind do please tell the Gas Undertaking Official what you have done.

Emergency Repair Equipment

Repair gangs and necessary special equipment should be capable of rapid assembly and equipment should be stored in at least two separate places in case one is bombed.

Mr. Bennie says that—

Lumber may be fire-proofed by thorough impregnation with a concentrated solution of sulphate of ammonia. Otherwise, paint with two thick coats of the following mixture: Sodium Silicate 112 lbs. pipe clay, or whitening and coloring matter 150 lbs., water 100 lbs. Fire-resisting paints may be applied to old buildings and should be used in new ones.

In London Gas Repair men have asbestos suits in which they can go into flaming craters to find the end of burning mains. London firemen have fireproofed asbestos suits.

War Gases

They are of the persistent and non-persistent variety and special attachments are needed for fitting to the usual gas-masks for use of gas men as coal gas, etc., will penetrate usual masks.

Special masks are designed to fit babies and small children.

Three Gas Identification Officers are recommended for 100,000 population.

Chemicals have been developed which, when painted on gas detector boards, change to certain known colors in the presence of corresponding poison gases.

Gas masks are specially fitted with microphones for use at telephone switch boards.

War Gases Chart—English Gas World, June 7, 1941, p. 283.

London Regional Gas Center

This was set up in the Spring of 1939—*before* war started—and has been enlarged and improved as required.

It is composed of 15 important Gas Undertakings, having 14,000 miles of mains from 52 works supplying over three million meters and a population of 9¼ millions.

There is a central report and control center manned day and night in which is a large map of the area. Pins are used to denote bombed areas. 600 telephones on 150 Exchanges are used to report to the center, works and depots, also 400 miles of private telegraph lines. These are supplemented by motor-cycle and bicycle messengers if necessary.

Three sub-committees are set up covering:—

1. Financial matters affecting the various companies.
2. Technical problems regarding manufacture of gas, repair of works plant, holders and gas works black-out problems.

3. Distribution problems, including the very important item of *inter-linking of neighboring companies' distribution systems into a grid.*
4. Obtain priorities for certain necessary materials.

The Control Center at all times knows where bombs have caused trouble and fires are burning, so if necessary is able to requisition men and equipment from companies not in the immediately affected area. Spare parts of all types are transferred in times of necessity.

You will be interested to know that under certain conditions the Army lends men to help mend mains. This is not such a bad idea when one realizes that according to the A.G.A. Monthly of September, 1941, the Gas Light & Coke Company of London have 3,208 employees in the armed forces.

During the bad times there were in London 10,000 laborers cleaning up the debris and another 7,000 repairing roads and streets.

The Control Center is an unusually fine example of co-operation at its best. It must be stressed that *inter-connection and standardization of equipment are of the greatest importance.*

Organizing With Others

It is extremely important for you to work in the very closest co-operation with all other local Public Utilities such as Electric Company, Water Department, Fire Department, Health (Sanitary) Department, Police and local Military Command. You will realize that before going very far with them you must have your own house very much in order which includes maps of your plant lay-out showing all mains and important valves as well as all district mains, valves and services. Interchange of visits and discussion with those concerned are of the utmost importance so that should necessity arise each will know what to do and, most important of all, where to do it.

Ambulance and First Aid

It is essential to have employees thoroughly trained in the art, and the British Library of Information in New York has suitable pamphlets. I specially recommend A.R.P. Training Manual No. 2—Manual for Officers Responsible for A.R.P. Training (15c) B.L.I. No. 114.

Decontamination Squads

Men should be selected for physical strength. This is important. They should be trained in methods of detecting gas and poisonous liquids and in methods of decontamination. A.R.P. Decontamination of Materials—Handbook No. 4 (15c) B.L.I. No. 87 and Handbook No. 4A —Decontamination of Clothing, including Oilskin Anti-Gas Clothing and Equipment, from Blister Gas (10c) B.L.I. No. 88 will be useful.

Camouflage

Bright colors of World War I are replaced with dull matt colors which blend into surrounding areas.

There are booklets on this matter such as A.R.P. Handbook No. 11—Camouflage of Large Installations (15c) B.L.I. No. 95. I understand the British Government will not permit certain information out of the country.

Steam exhaust and condensing tower steam are hard to camouflage and much local ingenuity is needed. I have read that cooling tower steam can be seen at 30,000 feet on a clear night.

Ballistics

1,800 kilo bomb will fracture pipes 75-80 feet away.

1,000 kilo bomb will fracture pipes 65 feet away.

500 pound bomb will fracture pipes up to 40 feet away.

Earth shock from 1,000 pound bomb may crack mains up to 250 yards.

1,000 pound bomb dropped from 20,000 feet penetrates clay 30-40 feet and protection from it should be 60 feet deep with cast iron cover.

At 11,000 feet a 2,000 pound bomb has angle of impact 15°-45°, hence necessity to protect doors and windows, holders, etc., from bombs and splinters.

Kinetic energy of 1,000 pound bomb striking a structure from 10,000 feet is 9 million foot-pounds. If it detonates in contact with a structure the kinetic energy released is about 30 times the impact energy.

Mr. Bennie says—Experiments in Germany with 1,000 kilogram charge (over 1 ton) showed inner sphere of explosive gases would be 65 feet radius, but at 1640 feet away maximum pressure during pressure portion of wave lasting 0.55 sec. was 31.6 lbs. per sq. ft. and mean suction 11.5 lbs. per sq. ft. and lasted 0.95 sec.

The natural frequency of oscillation of 212 buildings tested, of heights varying from 25 to 409 feet, was found to vary between ten and one period per second, while the British Building Research Station found the natural period of brick wall panels varying from 4½ to 13½ inches thick to lie between 21 and 45 vibrations per second, and the usual size of glass panes had periods of about 60 to 70 per second. This was frequently illustrated in Barcelona and Madrid.

Earth waves and ground movements of bomb detonations are not similar to earthquakes as they are of much less amplitude and of much greater frequency and acceleration.

British Public Utilities must write a report giving details of:—

1. Provision of Air-Raid Shelters for employees—if 30 or more.
2. Provision for continuity of service, and may receive Government financial grants.

Electric plant supplies must be made available for other plants if necessary.

Public Utilities must dim certain lights, eliminate plant glare, and may be required to camouflage. Government financial grants may be available.

Air-Raid Wardens must know location of local electric, water and gas mains, etc., their vulnerable points and position of valves, be able to assess damage and know where to get help. Public Utilities must be informed of shut-offs and are responsible for repairs; possibly with Government subsidy.

There is now compulsory industrial war damage insurance for plant and buildings.

I have only given you a number of the high spots on this subject, and would remind you again that you must interpret what I have said in the light of your own situation. There follows several pages of additional references which may interest you but I shall not read them.

Great Britain's Gas Industry

June 11, 1941, the "Institution" held its Annual Meeting in London, but held it down to one day with nine papers.

They are worried about possible coal shortage and perhaps you too should cast an eye in that direction.

A few months ago the "Gas Research Board" was incorporated, so you see the British are even now planning the future of their Gas Industry after the War.

The extensive references accompanying Mr. Beale's paper will be published in full in the February issue of the JOURNAL.—*Ed.*

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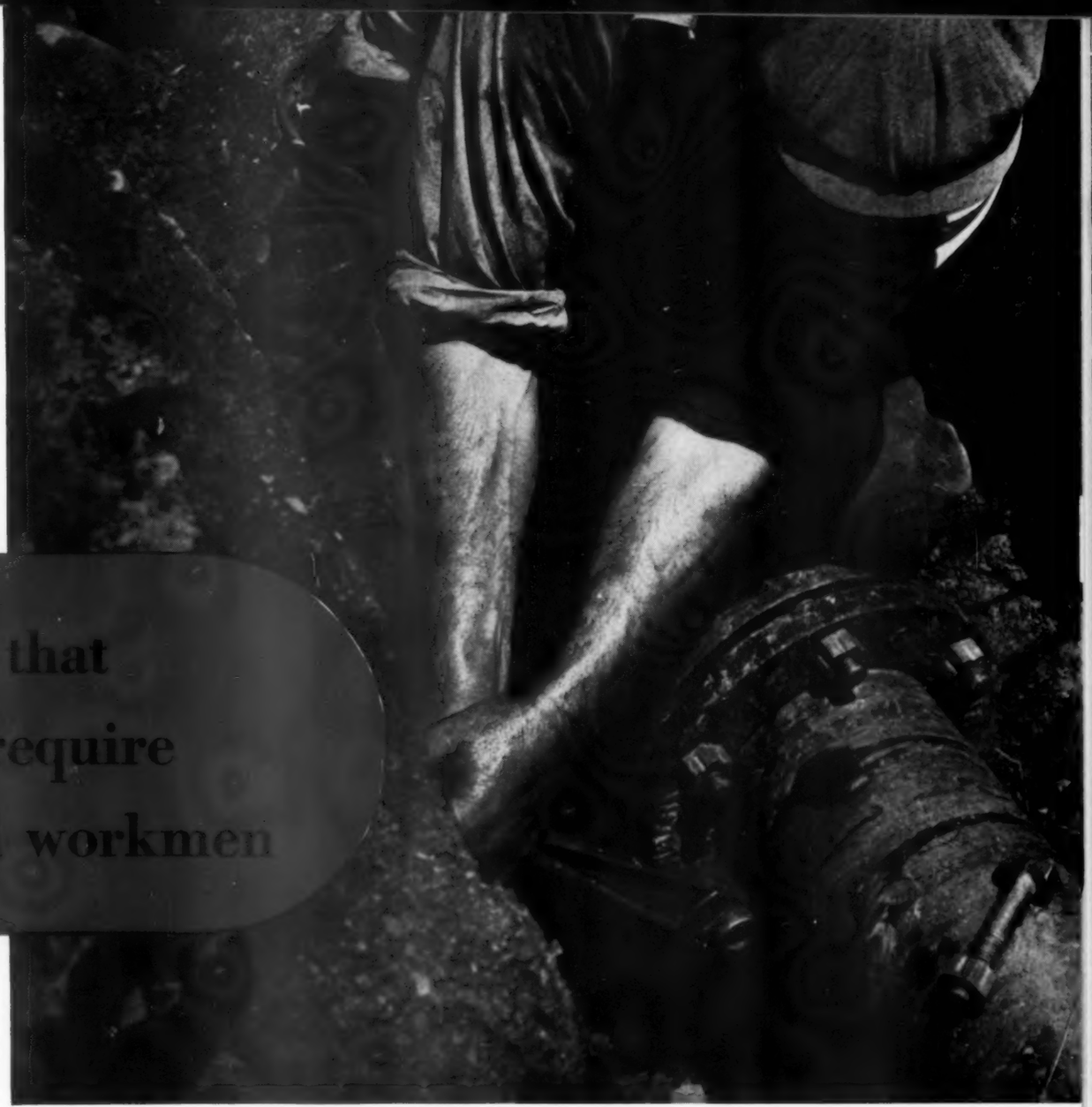

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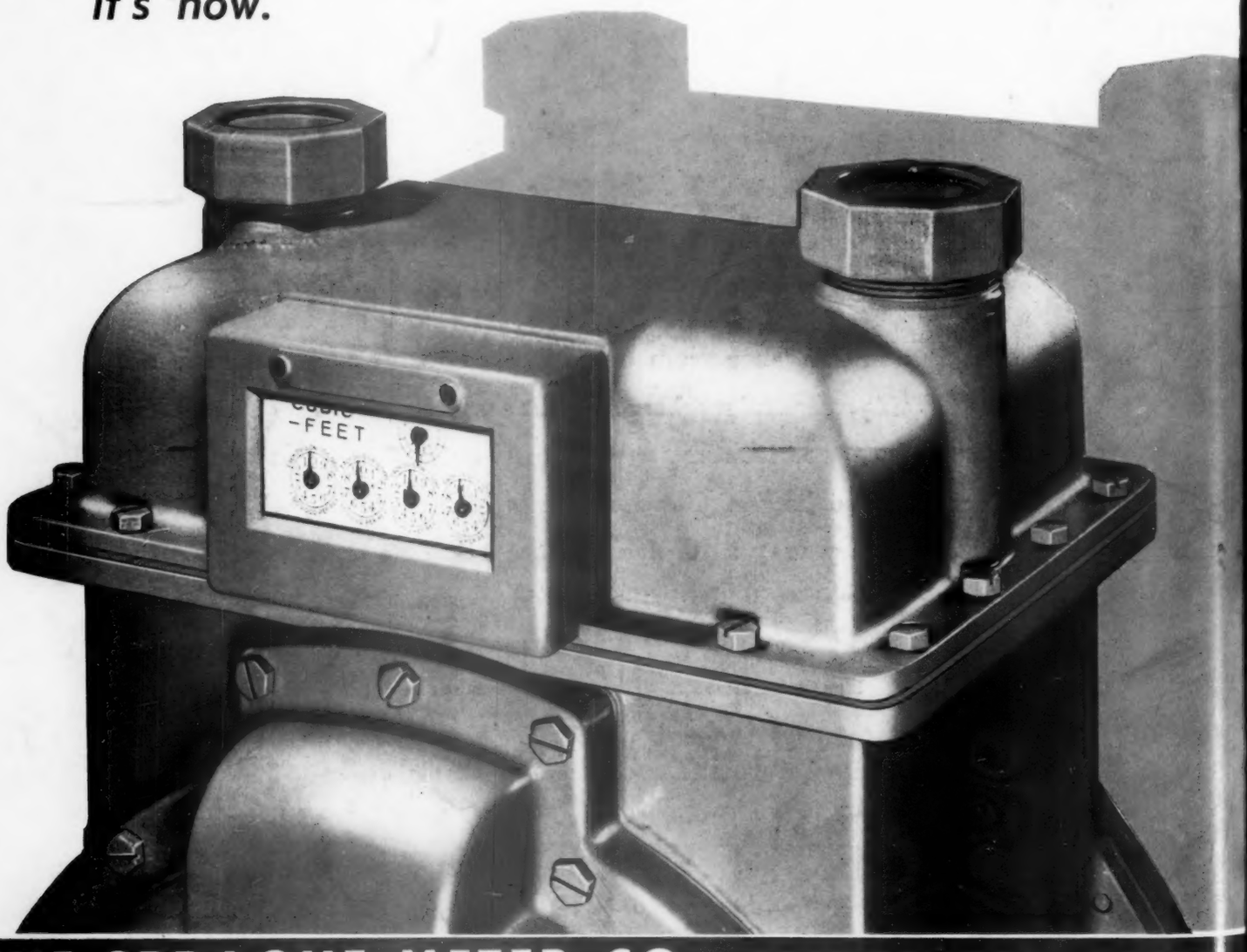

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